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SATURDAY DECEMBER 11 1943

TABLE OF CONTENTS

Physics and the Surgeon H. S. SOUTTAR, F.R.C.S. 737

Response to Flying Stress: Foundations of Confidence C. P. SYMONDS, D.M. 740

Disodium-Citrate–Glucose Mixture as a Blood Preservative J. F. LOUTIT, B.M., and P. L. MOLLISON, M.B. 744

Progressive Cerebral Ischaemia TREVOR H. HOWELL, M.R.C.P.Ed. 746

Absence of Vagina Treated by Baldwin Technique THOMAS O'NEILL, F.R.C.S. 746

Possible Developments in Social Medicine JOHN PEMBERTON, M.D. 754

MEDICAL MEMORANDA

Two Cases of Congenital Absence of One Kidney in Same Family. J. P. BOUND, M.B. 747

Sealing Intratracheal Catheters, and a Listening-tube. K. B. PINSON, M.R.C.S. 747

GENERAL ARTICLES AND NEWS

Treatment of War Wounds with Penicillin 755

Syringe for Transfusions and Infusions. LEONARD ROSENTHAL, M.B. 749

BLIND PHYSIOTHERAPISTS 755

THE SERVICES 768

UNIVERSITIES AND COLLEGES 768

MEDICAL NOTES IN PARLIAMENT 767

MEDICAL NEWS 768

LETTERS AND ANSWERS

Influenza—Chronic Pancreatitis—Lactation and Hormones—Measuring Surface Area—Umbilical Hernia—Kolpychia—Sulphonamides for Bronchiectasis—Insulin Lipodystrophy—Greatest Age of Conception—Paul-Bunnell Test in Infectious Mononucleosis—Income Tax—Nail Trephining—Resuscitation by Rocking—Painless Intramuscular Injections—Retrieving Foreign Bodies 770–2

REVIEWS

Industrial Medicine 748

Diseases of the Breast 748

Mental Health of Undergraduates ... 748

Notes on Books 749

Epidemiology Section 769

LEADING ARTICLES

Penicillin in Battle Wounds 750

Peripheral Blood Vessels 751

ANNOTATIONS

Treatment of Facial Palsy 752

Bill of Health for Two Great Cities ... 752

Oestrogens and Vaginal Glycogen 753

Toxoplasma in Man 753

OBITUARY

Tom Bates, M.B., F.R.C.S. 765

Fred Phillips, M.B., B.S. 765

W. H. Kiep, M.B., Ch.B. 766

John Gilmour, C.M.G., F.R.C.S. 766

G. W. Thomas, F.R.C.S. 766

Louis Beer, L.S.A. 766

J. Nigel Stark, M.D., F.R.F.P.S. 766

W. F. Chrispin, L.M.S.S.A. 766

Eric Pritchard, M.D., F.R.C.P. 766

E. W. D. Hardy, M.C., M.R.C.S. 766

John Levis, M.B., B.Ch. 767

W. Burton Wood, M.D., F.R.C.P. 767

G. H. Cowen, M.S., F.R.C.S. 767

Robert Lindsay, M.A., M.B. 767

MEDICO-LEGAL

Conditions in Detention Barracks 764

SUPPLEMENT

B.M.A. and Public Health *97*

G.M.C.: Disciplinary Procedure *98*

CORRESPONDENCE *100*

MORE BACK NUMBERS WANTED *100*

H.M. FORCES APPOINTMENTS *100*

POSTGRADUATE NEWS *100*

CORRESPONDENCE

Epidemic Hepatitis. A. C. PENMAN, M.B. 760

Endogenous Hypoglycaemia. R. D. LAWRENCE, M.D. 760

Industrial Lead Poisoning. R. E. LANE, M.B. 760

Malignant Tertian Malaria. J. S. MINETT, M.B. 761

Therapeutic Fallacies. M. WINTERNITZ, M.D. 761

Sulphathiazole in Impetigo. N. HOWARD MUMMERY, M.R.C.S. 761

Scabies and Impetigo. FREWEN MOOR, M.D. 761

Stilboestrol in Breast Cancer. D. C. L. FITZWILLIAMS, F.R.C.S. 762

Light Ether Anaesthesia. JOHN ELAM, M.R.C.S. 762

Adjuvants to Nitrous Oxide Anaesthesia. HELEN BOWER ALCOCK, M.R.C.S. 762

"Anaesthetist's Third Hand." J. NOEL-JACKSON, M.B. 763

Congenital Jaundice in a Man aged 77. F. PARKES WEBER, M.D. 763

Arsenicals in Vincent's Infection. SELWYN HOLMS, L.D.S. 763

Misuse of Vasoconstrictors in Coryza. T. M. DAVIE, B.M. 763

Treatment of Symptomless Phthisis. MARGARET MACPHERSON, M.D. 764

Treatment of Septic Hands and Fingers. A. G. S. BAILEY, L.M.S.S.A. 764

Psychiatry at the Cross-roads. R. E. M. COKE HARVEY, B.M. 764

REPORTS OF SOCIETIES

ROYAL SOCIETY OF MEDICINE: Epidemic Hepatitis 757

BRITISH ORTHOPAEDIC ASSOCIATION: Advances in Orthopaedics 757

NUTRITION SOCIETY: Post-war Nutritional Relief 758

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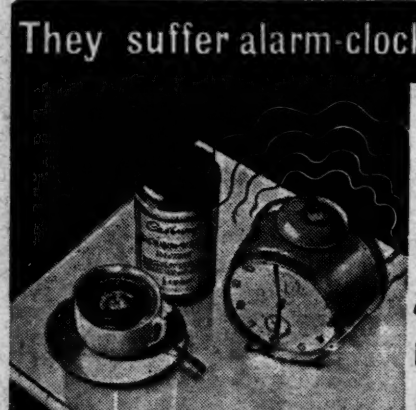

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY DECEMBER 11 1943

PHYSICS AND THE SURGEON*

BY

H. S. SOUTTAR, C.B.E., D.M., M.Ch., F.R.C.S.

Surgeon to the London Hospital

William Wood Bradshaw, whose memory this lecture honours, was born in 1801 and became a member of our College in 1833. He was a man of unusual enterprise, for in the same year he became a Doctor of Medicine of Erlangen, and his appreciation of education was further shown when in 1844 he matriculated at Oxford as a Gentleman Commoner of New Inn Hall, becoming a Master of Arts three years later. He practised as a doctor in Reading, and in 1854 this College showed its high opinion of his worth by electing him a Fellow as a Member of 20 years' standing. He died in 1866, and his widow endowed a lecture at each of the Royal Colleges "to maintain her husband's name in good repute by associating it with the advancement of the science which he loved, and to testify her gratitude for the happiness which she owed to him." I feel that William Bradshaw was a man we should all like to have known and whose memory we gladly honour. He was an ornament to the College, and I am grateful to our President for the opportunity he has given me of following his own memorable Bradshaw Lecture of 1940.

It has been customary to choose as a subject for the Bradshaw Lecture some aspect of surgery which has interested the speaker for much of his life, which is of general interest to his colleagues in the art of surgery, and which is not without interest to the layman. In choosing as my subject Physics in Relation to Surgery I have entirely satisfied the first condition, and I hope to satisfy the other two. It is of course a vast subject, and I can only touch on a few of its fields; of these I have chosen Force, Heat, and Radiation as branches of physics which affect the surgeon most closely and which he is constantly turning to his own use. But even in these I must limit myself to a few problems with which I have met in surgical work and upon which some knowledge of physical principles has thrown light, sometimes revealing important features that would otherwise have been missed.

Force and Movement

Two of the most important subjects considered in physics are Force and Movement, and of these we have endless examples in the human body. The movement, of course, occurs at the joints, and the force is exerted by the muscles; but few of us are aware of the forces which the muscles can exert, or appreciate the exquisite precision of the mechanism by which the movements are controlled. The best examples are always obtained from one's own experience, and I cannot choose a better illustration than one from an exercise of which in years gone by I had ample experience—the pulling of an oar. From our standpoint it is a very simple action and lends itself to accurate measurement, though from the oarsman's point of view it is anything but simple. Seated on a sliding seat and driving with his full power from the stretcher, he can exert a drive of 400 lb. weight. As his seat moves freely it follows that through each of his legs he exerts a driving force of 200 lb. Let us see how this is accomplished.

Although apparently so simple, the movements involved are by no means simple and the forces employed are exceedingly complex. The most important movement, however, is the straightening of the knee, and the muscle effecting this is the quadriceps extensor. Now in my own case, while the slide travels 18 inches my patella travels only 3 inches, or one-sixth of the track of the slide, and therefore if the quadriceps alone did the whole of the work the force exerted by the quadriceps on the patella would be six times the driving force exerted by the leg, or 1,200 lb. This is an exaggeration, as other muscles act indirectly, and noticeably the gluteus maximus in extending the hip; but I should be well within the mark in saying that my quadriceps alone can exert a force of 600 lb., and that the whole of my thigh muscles acting together can exert a total force of half a ton. Moreover, these great forces have to be exerted with the utmost delicacy, for the watermanship which controls the balance of a racing boat depends upon differences in the pressure of the toes measured in ounces.

Now the modern treatment of a fractured femur is to reduce the fracture to an accurate position by traction, and it is usually found that a force of 15 lb. is quite sufficient. How do you account for such a ridiculous disparity? To talk about tiring out the muscles is absurd, for the effect on the patient's comfort is immediate. What really happens is that the irritation arising from the fracture is checked, the reflex which produces spasm of the muscles is broken, the muscles relax, and it is on the relaxed muscles that traction is exerted. It is of importance that this point should be remembered when the powerful methods of modern skeletal traction are employed, and its neglect has often resulted in failure of a simple fracture to unite.

In order that such a small force should be effective it is essential that the limb should be slung quite freely so as to avoid friction, and if this is done the traction force has a secondary result, to which it is worth while to call your attention. There must, of course, be some counter-pull to prevent the patient being pulled out of bed, and this is most easily obtained by raising the foot of the bed. But you will see at once that this counter-pull acts on the centre of the pelvis, while the traction pull passes through the hip. This side of the pelvis is thus pulled down so that the pelvis lies obliquely and the leg is effectively abducted at the hip. In the case of a fractured femur this is of no importance, but in many conditions of the hip-joint abduction is the essential point in treatment. You might imagine that this would easily be obtained by swinging the leg out; but this is by no means the case, as the pelvis may swing with it. Traction in the line of the leg is the correct physical method of obtaining abduction; but this simple fact is not generally appreciated, and the so-called abduction splint is still too often seen, even—low be it spoken—in the wards of orthopaedic surgeons. Moreover, traction in the line of the femur can abolish pressure

* The Bradshaw Lecture, given before the Royal College of Surgeons of England on Nov. 11, 1943.

on the hip-joint, and in the case of inflammation in the joint this may effect the immediate abolition of reflex spasm and the dramatic relief of the patient. Direct attempts at abduction will increase the pressure and, by increasing spasm, make abduction impossible.

One of the most interesting muscles in the body from the physical standpoint is the biceps muscle of the arm. As its name implies, it arises by two heads from the scapula; it lies in front of the humerus, to which it has no attachment, and is inserted into the back of a tubercle on the inner side of the radius. Its action is thus a very complex one, and the provision of a single muscle for this very complex movement is a measure of its importance It rotates the forearm outwards, it flexes the elbow, and it flexes the shoulder; and it thus achieves the most important of all human movements, for it enables us to bring food to our mouths.

But for the moment I would direct attention solely to one element of this movement—the rotation of the forearm. The very powerful movement of supination is effected by two muscles, the biceps and the supinator brevis, both acting at what we term great mechanical disadvantage and the biceps taking the larger share. By holding a weight at the end of a rod and raising it by rotating the forearm it is easy to measure the force involved and to show that the biceps tendon, which is no bigger than a shoelace, can easily support a tension of at least 100 lb. weight.

But the biceps does far more than merely provide a powerful force, for by its nervous connexions it measures the amount of force and adjusts it to requirements, and at the same time it acts as a delicate feeling piece, defining exactly the degree of its contraction and giving most precise information as to the position of the limb. How superbly the muscles perform this function can be seen in the facility with which a pianist can strike a distant note with absolute certainty and without the aid of vision.

The position of the hand and arm produced by contraction of the biceps, supination, and flexion of the elbow and shoulder is of particular interest, as it is that adopted by the violinist and the fencer, and, far from being an abnormal position, it is that in which the fingers and the whole limb are under the most perfect control. I do not suppose that it has ever occurred to a violinist that it is to his biceps that he owes the possibility of maintaining the position of his left hand. Still less would it occur to him that the peculiar action of the *right* hand in drawing the bow, described as raising the wrist, is essentially based on a rotation of the forearm, again controlled by the biceps. Rotation of the forearm is indeed a movement of countless uses, and one over which it is possible to develop the most exquisite control.

Another muscle whose mechanism has always fascinated me is the opponens of the thumb. This little muscle is capable of exerting great force, and with the adductor pollicis forms the basis of a powerful grip. But the beauty of its action consists in the *rotation* which it gives to the thumb so that this may face the object grasped. Whatever the size of the object—a large ball, a ring, a pencil—it will be found that the pulp of the thumb faces the object and ensures a powerful and yet most delicate grasp. It is one of the most perfect examples of adaptation to function in the human body.

Force and the Skull

So far we have considered the forces exerted *by* the human body. Let us now consider the forces it is capable of resisting, and as an example let us consider the effects of a blow on the head. If a man were struck on the head by a stone weighing 1 lb. and falling a distance of 9 ft., he would probably have some degree of concussion, although his skull might not be broken. Let us consider the forces involved. The stone falling 9 ft. reaches a velocity of 24 ft. per second, and as it weighs 1 lb. it has acquired 288 foot-second units of energy. If it deforms the skull one-quarter of an inch, which is about the possible limit, it means that the resisting force has destroyed this amount of energy in 1/48 of a foot, and the average force must therefore be 48×288 units of force, or 432 lb. weight. If this be distributed over an area of the skull $2\frac{1}{2}$ in. in diameter it would mean a local pressure of 86 lb. to the square inch.

Now, the skull is for all practical purposes filled by an incompressible fluid, which for such sudden forces has no escape. Any deformation will be resisted by a rise in intracranial pressure, and the effect of this will be enormously greater than any resistance offered by the comparatively elastic skull. Thus the rise in intracranial pressure in the case we have described will be at least in the order of 80 lb. to the square inch. Such a pressure, even though it lasts only for a fraction of a second, must force every drop of blood from the capillaries and leave the brain completely anaemic, with the clinical result of a complete and instantaneous paralysis. Surely this provides a complete justification of Trotter's theory that the phenomena of concussion are the result of sudden anaemia resulting from the rise in intracranial pressure. So far as I am aware he never actually calculated the pressure, but the surmise is an example of the penetration of his intellect. No more acute brain than that of Wilfred Trotter has ever adorned the College—like a diamond in the keenness of its penetration, in its crystal clearness, and in the sparkling brilliance of its humour, as he himself was like a diamond in the flawless perfection of his character.

My attention was first directed, many years ago, to the problem of intracranial pressure by a curious case which came under my care at the London Hospital. A child of 3 years had been knocked down by a light cart, the wheel of which passed over her head. She was unconscious and had a large and very dirty lacerated wound of the scalp above and behind the right ear. I cleaned the wound up as well as I could, and in doing so noticed a fine crack running vertically through the centre of the temporal region. The condition of the child precluded any further disturbance, and indeed I was astonished two days later to find that she was fully conscious and in very fair condition. Then, however, she went back, and at the end of four days from the injury was comatose, with clear signs of intracranial pressure. Expecting to find an intracranial haemorrhage, I trephined and discovered beneath the hairlike crack not blood but an extradural disk of hard mud, 2 in. in diameter and 1/4 in. thick in the centre. I removed the mud and left the skull widely open. To my amazement the child made an uninterrupted recovery.

Now, the considerable mass of mud can only have got in through the crack, and as the force applied was but momentary, the crack must have opened widely. If one may estimate the momentary force as 250 lb. weight, this would be supported only by the pressure within the skull, for the skull of a child is far too fragile to offer appreciable resistance to such violence. If, further, we regard the child's skull as a sphere 5 in. in diameter and imagine it to have been flattened by the compression of the wheel over an area $2\frac{1}{2}$ in. in diameter, as would seem a reasonable approximation, we find that the force of 250 lb. weight must have been supported on an area of 5 sq. in., so that the pressure within the skull must have been 50 lb. to the square inch. Now the central cross-section of a sphere 5 in. in diameter is just 20 sq. in., and as the internal pressure, although momentary, is exerted equally in all directions this means a disruptive force of 1,000 lb., or nearly half a ton, so that the wide opening of the crack is fully explained. That such forces must produce anaemia is obvious; that the brain should recover shows how little even the most delicate cells are affected by mere pressure and that in every case its most important effect is to deprive them of their blood supply.

The Absorption of Heat

A very interesting problem in physiological physics, and one with practical results of the first importance, is introduced by the application of heat to the surface of the body. As a simple example let us consider what happens if the forearm is placed in a tank of flowing water at 110° F. If the forearm were a mere mass of inert flesh its temperature would rapidly rise to that of the water; but that this does not occur is shown by a very simple experiment which I owe to Sir Thomas Lewis. If while the arm is immersed in the bath its circulation is checked, in a few seconds the feeling of comfortable warmth gives place to intolerable pain, for the deep layers of the skin are too sensitive to stand such a temperature. With an intact circulation the vessels of the skin rapidly dilate and the heat is carried off by the blood stream,

so that the temperature within the limb is prevented from rising to a painful level. The temperature in the deep tissues does, however, rise to a certain degree, and in response to this the vessels dilate and the blood flow increases. This necessarily results in increased metabolism and an internal production of heat in the limb.

An elaborate protective mechanism is thus brought into play, depending for its effectiveness upon an intact circulation, and in this the skin plays a predominant part. The skin protects the deep tissues in two ways. When it is cold and avascular it forms an efficient defence against the loss of heat, without which one could survive in a cold sea only for a very short time. When it is warm its vascularity increases enormously, so that the blood flow may be a hundred times as great, and it now protects the deep structures by the amount of heat it can carry away in the blood stream.

If, however, owing to local pressure or some defect in circulation the flow of blood in the skin is diminished, this protective mechanism breaks down and the temperature of the skin itself, or even of the deeper structures, may rise to such a point that coagulation and local death of the tissues occur. This is undoubtedly the explanation of many of the hot-water-bottle burns, especially under anaesthesia and in patients with defective circulation. It is the explanation also of necrosis arising in another circumstance, in which the connexion is far less obvious.

Endothermy is one of the most valuable gifts of physics to surgery, and with reasonable precautions and in skilled hands it would seem to be perfectly safe. It consists in the passage through the body of a high-tension current which oscillates to the order of a million times a second—so rapidly, in fact, that none of the chemical effects of electricity occur in the tissues. The current, however, is comparatively large and may reach as much as three amperes, so that a great amount of heat is produced by the resistance of the tissues; and it is characteristic of endothermy that, as the name implies, the heat is produced *in* the tissues. If, for example, the two poles of the apparatus are held in the hands the only sensation is one of peculiar warmth inside the wrists and spreading up the arms.

Now, provided that the heat is carried off by the circulation so that the local rise of temperature is not excessive no harm results. If, however, this condition is not satisfied terrible disasters may occur. It is quite common to place the so-called indifferent pole under the sacrum, and unless a large soft pad is used it is obvious that the pressure on the thin skin in this region may render the skin avascular, so that its temperature may rise to a dangerous point. But this is not all. The sacrum itself has a poor blood supply and is not very sensitive, so that even in a conscious patient its temperature may rise dangerously. I know of two cases in which it underwent total necrosis. The risk of such a disaster is very real, and the indifferent endothermy pole should never be placed in this position. In fact, wherever it is applied care must be taken that the blood supply of the tissues is adequate and not obliterated by pressure; for unless this condition is satisfied extensive necrosis of the skin may occur.

The increased metabolism which arises from the heating of the tissues introduces considerations which show how dangerous it is to regard the body as a mere piece of physical apparatus, and this is especially the case where there is a defect in the circulation. If heat is applied to a limb in which the circulation is so defective that it cannot respond to the demands made upon it, gangrene may be precipitated. If, on the other hand, heat is applied to some other part of the body no harm can be done, since heat can only be conveyed to the damaged limb by its circulation, and increase in this can only be beneficial. In a case, therefore, of incipient gangrene heat may be applied to any part of the body other than the affected limb, where only the loss of heat should be prevented.

Similar considerations apply in certain cases of shock; for if the body is heated when the amount of circulating blood is inadequate the resulting vasodilatation and increased metabolism may actually result in a further lowering of the blood pressure, with even fatal results. The supply of heat is justified only when it has been established that there is an adequate amount of blood in active circulation.

Radiation

I would turn now to another branch of physics of recent development, the implications of which we are only just beginning to realize. Radiation is of course one of the oldest of physical studies, for it is radiation which brings to us the heat, energy, and light of the sun; but it would not be too much to say that its developments in the last 25 years have revolutionized our lives. To it we owe the wireless waves which allow us to speak and to listen across the world. *X* rays are only one of its forms, and it is to radiation alone that radium owes its power.

The radiation of which I am speaking consists of ether waves transmitting energy across space at a uniform velocity of 186,000 miles a second, so that the light of the sun takes just 8¼ minutes to reach us across 93 million miles of space. No matter what the wave-length of ether waves their velocity is unaltered, but the physical effect of the radiation depends on the wave-length. In order to appreciate the vast range of wave-lengths at our disposal, one may make a diagram in which the whole range of 60 octaves which we use is illustrated graphically by objects of similar dimensions. At one end of the scale we have the very long waves, each of which might reach from here to Aberdeen; and then we have the ordinary wireless waves ranging from 2,000 metres to as little as 10 metres—a range of about 8 octaves. Heat waves come next, occupying a short region of wave-lengths from one-hundredth to one-thousandth of a millimetre; and then comes the single octave which gives us light. For this octave alone are we provided with any sense organ capable of appreciating the vibrating energy by which all space around us and within us is filled. To this octave we owe our perception of the beauty of form and colour by which we are surrounded, and without it the blue sky, the rolling clouds, the green fields, and the infinite variety of Nature's shades would for us no longer exist. One wonders what the other octaves might reveal could we but perceive them.

Beyond the light octave come the ultra-violet rays, and, far beyond these, *x* rays and the gamma rays of radium, the last so short that one hundred thousand would be required to equal one wave of yellow light.

Now, it is a fundamental law of radiation, although it was discovered by Planck but a few years ago, that it can only exist in certain units of energy and that the energy in each unit is inversely proportional to the wave-length: thus the unit of energy for hard gamma rays is one hundred times that of ordinary deep *x* rays and a hundred thousand times that of yellow light. It is to this that such rays owe their penetrating power and their effects upon the tissues. The shorter the wave-length the greater the energy, and in exact proportion; so that to compare the unit of energy from radium with the unit of visible light is to compare a 12-in. shell in full flight with a pellet from an air-gun.

X rays and the gamma rays of radium have now taken their place as established instruments of surgical technique, but to understand their use it is essential to know something of their origin and nature. Both arise within the atom, but from very different sources.

In the modern view all matter is built up of atoms, and each atom of any one substance has an identical structure, whilst all atoms are variations and elaborations of the same general pattern. Each atom consists essentially of a nucleus round which circulate a number of electrons, themselves minute and identical particles of negative electricity. Hydrogen is the simplest of all atoms, consisting only of a nucleus and one electron. Helium has a larger nucleus and two electrons, and the atoms of the elements gradually increase in size until we reach uranium, with a vastly complex nucleus and a cloud of 92 electrons flying around it. Radium itself is nearly as complex with 88 electrons in its service.

Radiation arises from disturbance of the electrons in their orbits and from their attempt to regain their normal positions. As one might expect, the possible radiations of any given element are strictly limited, and to this it owes its spectrum. Every element has its own peculiar spectrum or group of lines, each of which represents one wave-length of radiation, the whole forming the signature of the element by which its

presence can be detected with absolute certainty even in the furthest star. Various forms of disturbance can give rise to radiation, and the commonest is, of course, heat, the source of most of the spectra with which we are familiar.

There is, however, a much more powerful way of arousing the electrons to radiate, and that is by hurling at the atom a stream of electrons driven by strong electric forces, and it is in this way that *x* rays are produced. The result is a radiation of short wave-length, perhaps one ten-thousandth of that of light and of corresponding energy. To obtain such results a modern *x*-ray plant may require half a million volts—a really terrific force comparable to that of a flash of lightning. It is a wonderful achievement that we are able not only to produce such vast physical forces but to control them and to bend them to our service.

The gamma rays of radium arise also from a disturbance of the electron field of the atom, but this disturbance is produced not by any outside influence but by an explosion of the nucleus of the atom itself. For reasons of which we are entirely ignorant the nuclei of the atoms of radium explode at regular intervals at an absolutely uniform rate of roughly one atom in a million per day. As a result, another substance—the gas radon—is formed, the atoms of which again explode but at much shorter intervals, and this process is repeated until there is left only an inert particle of lead. The whole process is described as "decay," and it is not too much to say that the discovery of the decay of radium by Becquerel revolutionized all our conceptions of matter.

These successive explosions of the nucleus in the process of decay produce a violent disturbance of the electron field of the atom, and as a result a radiation is produced of very short wave-length and enormous energy. The radiation is thus identical in kind with that of *x* rays, but of *x* rays produced by an energy of two million volts. Moreover, such *x* rays would require a huge engineering plant for their production, while the gamma rays are given off in a continuous stream by the most minute particle of radium.

Now it has been found that such radiation of short wave-length and great energy had a profound effect upon the tissues, and especially upon cellular growth. Where the cells are dividing rapidly they may be completely destroyed, and it is this property which gives these rays their peculiar value in the treatment of malignant growths. In such growths the cells are always dividing at a rate many times, sometimes thousands of times, more rapid than that of normal cells, and it is just this rapid division which marks them as vulnerable to *x* rays and gamma rays.

But it must not be imagined that the normal tissues are immune. They are profoundly affected, and the greatest skill is required to destroy a growth by radiation without doing irreparable damage to the tissues in which it lies. Some sacrifice is unavoidable, but it should be only such as can in time be remedied by the natural processes of repair.

Of the exact mechanism by which the radiation produces its effect upon the cell we know almost nothing; but it must certainly be atomic, and the primary effect must be the ionization of certain atoms and a consequent rise in their chemical activity. Some substance is thus produced which is toxic to the cell, or perhaps some substance is destroyed which is essential to its normal growth. It would seem to be upon the chromosomes and upon the reproductive mechanism of the cell that the effect is most severe, for it can be shown that the cells which survive and continue to reproduce are themselves deformed and transmit their defects to succeeding generations.

It is evident that in radiation we possess a powerful but very dangerous weapon, for though it may destroy a malignant growth it may do incalculable damage to the tissues which remain. Moreover, if the growth is not completely destroyed and reappears it will now spread in the tissues damaged by radiation, with annihilating effect. I believe that in radiation we have one of the greatest weapons of surgical progress; but it is indeed a weapon and not a tool, and only those who are prepared to devote their lives to its study have any right to use it except in very limited fields or with the close co-operation of those who understand its dangers as well as its powers.

Conclusion

I have ranged over a very wide field and yet I feel that I have only touched the fringes of my subject. I hope that I have convinced you that there are many points at which the work of the surgeon enters the field of physics and that towards the solution of many of the problems of surgery the physicist could give invaluable help. I trust that the future may see a fuller collaboration between two branches of science which at first seem to have little in common and that each may gain from the experience which the other brings.

THE HUMAN RESPONSE TO FLYING STRESS*

BY

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LECTURE II: THE FOUNDATIONS OF CONFIDENCE

Fearlessness

In this lecture I shall consider the nature of fearlessness, by which I mean a state of mind in which fear is absent under circumstances which would naturally be expected to arouse that emotion. I should make it clear at the outset that I distinguish fearlessness from courage. The latter is a state of mind in which fear is present, but is endured for the sake of attaining an object. Fearlessness, as the word implies, is a state in which there is no need for courage because fear does not exist. Fearlessness in relation to a particular stimulus pattern may be primary—meaning that no fear response has ever occurred; or secondary—meaning that the fear response was at one time present but has since been lost. Reverting to what has been said of the origin and growth of fear reactions in children, we may postulate causes for fearlessness of the first kind. First, certain trigger responses may be lacking owing to constitutional variation. Secondly, the process by which the original trigger responses normally develop, so that they respond to a wider range of stimulus patterns, may be interfered with. This process may be called learning, or in Pavlov's (1927) terms the development of conditioned responses, and may be interfered with in a number of ways. Broadly speaking in terms of conditioned response, we may distinguish between processes which depend upon variations in the efficiency of the cerebral cortex as analyser and those which result from variations in experience and training. For either of these reasons there may be failure to acquire those fear reactions which most people do acquire as the result of conditioning.

Thus there is a kind of fearlessness which is associated with lack of intelligence or imagination. Fearlessness of this origin may be a source of strength in time of danger, but carries with it a source of weakness. The same defect of brain or mind which prevents the acquisition of fear by conditioning or experience prevents the inhibition of fear by conditioning or experience. Thus the stupid man is fearless in the presence of remote or complex danger, but in the presence of immediate obtrusive dangers he is apt to be more overcome by fear for the moment than others of greater intelligence. Nevertheless the man whose lack of imagination prevents anticipatory fear is thereby saved much stress.

That training and experience, or lack of experience, may affect the range of fear reactions is theoretically obvious and commonly observed. The factors involved are numerous and complex. Parental example and influence are clearly of great importance, and begin to operate so early that it must be very difficult to trace their origins. It is possible that an inhibitory process may in some instances anticipate the development of a positive conditioned response, or even, as Valentine (1942) suggests, that inhibition may be so well established on some other foundation that an unconditioned fear response destined

* Based upon the Dunham Lectures at Harvard University, March, 1943, and the Croonian Lectures before the Royal College of Physicians of London, May, 1943.

to mature late never appears. The fearlessness of inexperience, due simply to lack of opportunity for the development of the ordinary range of conditioned fear responses, may be viewed separately. It is commonly observed in children, but comparatively rarely in adults, except under novel circumstances such as those of war. Then the noise of the approaching shell may leave the novice unmoved while at once exciting fear in the man who is aware from experience of its meaning. Unawareness of danger may also occur (even in the experienced person) from narrowing of the field of consciousness. A man may be so preoccupied with task or train of thought that there is no room for the idea of danger. The direction of such preoccupation has probably an emotional bias with inhibitory effect.

Apart from those varieties of fearlessness which depend upon the number and specificity of innate tendencies and the capacity and opportunity for acquiring conditioned reactions, both of a positive and of an inhibitory kind, it seems not impossible that in some individuals—to borrow a physiological expression—the threshold for fear is relatively high, as an innate quality. Such innate variation in the threshold of the fear response would be comparable with the variation in the affective response to painful stimuli observed by clinicians. The individual who is relatively insensitive to fear—using the word "insensitive" with this restricted meaning—may be fearless under circumstances which would be expected to arouse fear in others, not for lack of intelligence, imagination, experience, or attention, but because the stimulus, whatever other effects it produces, fails to arouse the affective response. Such a man might at the extreme react to danger with flight but not feel fear, for the same kind of reason as a man insensitive to pain might throw away a match which he saw was burning his fingers without feeling pain.

Continuing with the same metaphor, fearlessness may be due to a low threshold for some affective response which can inhibit fear. Most fear-evoking situations are complex, and contain stimuli capable of evoking affects other than fear. Just as there are persons who are by nature especially sensitive to the evocation of fear, there are those in whom other kinds of affective response are relatively easily aroused, more intense, and of longer duration. Anger provides a good example, for many situations which are capable of provoking fear are also capable of provoking anger. If a person with a low threshold for anger be exposed to such a situation he may feel anger when another person would feel fear. Fear in these circumstances is inhibited.

Inhibition as a Basis for Fearlessness

I have already used the word "inhibition" more than once in connexion with the absence of fear, and it becomes necessary at this juncture to discuss its meaning, for I believe that inhibition, besides playing some part in primary fearlessness, is the basis of all secondary fearlessness, the subject which I am next going to consider. The neurophysiological concept of inhibition is best illustrated from the spinal or decerebrate animal. Here for a given muscle an afferent nerve may be found whose stimulation causes reflex contraction; another, whose stimulation diminishes or abolishes contraction if already present. Concurrent stimulation of excitatory afferent and inhibitory afferent reveals gradation of effect according to the intensity of the stimuli. A strong inhibitory stimulus will abolish, a weaker inhibitory stimulus will only diminish, the effect of the same excitatory stimulus. But, as Sherrington (1925) has said, there is more to be observed than this:

> "Stimulation of the inhibitory afferent when the excitatory reflex is not in operation may seem to produce no central effect. That this absence of central effect is, however, only semblance can be shown in several ways. Thus precurrent brief stimulation of the inhibitory afferent will lengthen the latency and diminish the result of a closely following stimulus of the excitatory afferent. Again, stimulation of the inhibitory afferent begun precurrently and continued concurrently with stimulation of the excitatory afferent can prevent altogether or diminish the reflex result of the latter."

The inhibitory effect under these conditions is not manifested directly, but indirectly by the absence of an expected contraction or an expected degree of contraction.

Contraction of a skeletal muscle depends upon the excitation of the motoneurone, and reflex contraction upon whether the flow of impulses peripherally aroused reaches the motoneurone to excite it. Sherrington conceives an interplay of central excitatory and central inhibitory activities at a point of confluence which he describes as "upstream" of the motoneurone. Whether the motoneurone is set into activity or not depends upon the balance here between central excitatory and central inhibitory states. The central inhibitory state is as much a

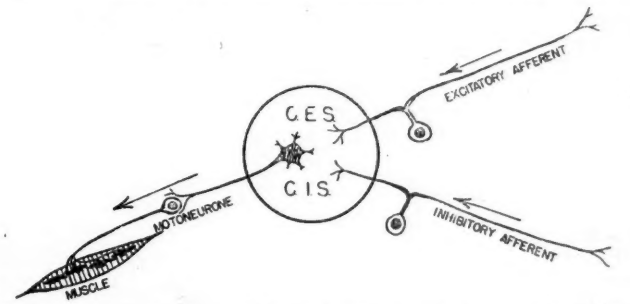

Diagram to illustrate the balance between excitation and inhibition in the reflex arc. C.E.S. = central excitatory state; C.I.S. = central inhibitory state.

positive phenomenon as the central excitatory state, and must itself be excited by appropriate impulses from without. When thus excited it safeguards the motoneurone partially or wholly from excitation. It seems that the hypotheses of central nervous function at the reflex level which I have outlined may be applied with profit and without any great stretch of the imagination to physiological processes underlying the excitation of affect. We may suppose a central inhibitory state for a given affect (for example, fear), maintained by appropriate afferent stimuli, which would not be manifest at all except when stimulation of the excitatory afferent for this affect occurred. Then the inhibitory state would be revealed either by the absence of any affective response or by a response of unexpectedly small degree. We should then observe what we have described as fearlessness—the absence or relative absence of fear in relation to situations which might be expected to cause it.

The analogy of inhibition in a physiological sense has previously been employed by Rivers (1924) with particular reference to fear or "wind up" in air-crews during the last war. Rivers identified inhibition with the psychopathological concept of repression, and assumed that when a reaction to danger was unaccompanied by fear this emotion was present "in the unconscious." It is difficult to accept this concept, for, as McCurdy (1925) remarks, "repressed" or "unconscious" affect is a contradiction in terms. An affect as such cannot have any existence unless it is conscious, because it is something that a person feels: it does not exist until it is felt. The view which I have taken differs in supposing inhibition to occur "upstream" of the point of affective response. The central inhibitory state is revealed by the absence of affect, as in the motor system it is revealed by the absence of contraction in a given muscle. The affect might be said to be potentially present in so far as nervous impulses have been generated which would have excited the affect if they had not been blocked short—"upstream" of—the central point of excitation. But there has been no experience of affect, no registration of affect in "the unconscious."

There are two further points of reference for this analogy. An excitatory impulse if blocked by inhibition has no apparent effect, but this again is only semblance. It will have added an increment of excitation to the central excitatory state, thus cancelling an equal amount of the central inhibitory state. The balance in favour of inhibition is thus temporarily diminished, and a further excitatory impulse arriving during this time will meet with less resistance. This is in accord with the observation, which seems from introspective account to be true, that a frightening experience which does not in itself excite fear may have the result that for the time being fear is more easily excited by another stimulus of the same kind. There is, in fact, at the physiological or subconscious level central summation. The second point is that inhibition may provide one explanation for the absence of fear at the time of danger and its appearance later when the danger is past. The

inhibitory forces may be various—anger, sense of duty, self-regard, or what Rivers called manipulative activity. These contribute to a central inhibitory state which occludes fear for the time being. As the situation develops the strength of these inhibiting stimuli becomes less. The occasion for anger is past, duty and self-regard are satisfied, the central balance alters, inhibition is weakened, and fear if still excited appears.

This attempt to describe certain aspects of fearlessness in physiological language is made not without realization of the dangers of over-simplification. Its excuse must be the desire to be explicit in applying the word "inhibition" to affective processes.

Pavlov's Observations applied to Fearlessness

I have already referred to the observations of Pavlov (1927) on the development of conditioned responses in connexion with the growth of fear. His observations on inhibition are of equal value in understanding the growth of fearlessness. He showed that by various means it was possible, after a conditioned response had been established, to diminish or prevent the expected flow of saliva. The main variations of Pavlov's inhibitory responses, as will be remembered, are as follows. If a positive conditioned reflex (salivation) is established by the association of a stimulus—for example, the sound of a bell, with subsequent feeding—and then the bell is sounded on several occasions without feeding, salivation ceases to occur. The conditioned response is then said to have suffered extinction. The extinction of conditioned fear is a matter of common observation. A previously indifferent stimulus becomes by association a danger signal and by itself produces fear. One may take as one example the sound of a siren which has been followed by the fall of bombs. A conditioned fear response has now been established. Now, if the same stimulus is frequently repeated without subsequent bombing it ceases eventually to elicit fear. The conditioned fear response has been extinguished.

A second variety, called conditioned inhibition, is induced thus. A well-established conditioned stimulus is combined with a new (indifferent) stimulus, and the combination is repeated without subsequent feeding. The new combination soon becomes ineffective, though the original stimulus uncombined is still effective. Conditioned inhibition is an important factor for the acquisition of fearlessness in any occupation which at first excites fear. The instructor makes use of it in training, combining with hazardous manœuvre a trick or ritual: the man who carries a mascot to support his confidence is using the same method.

Differential inhibition is the name given to a third category of Pavlov's observations. A musical tone, for example, is used to establish a conditioned response. It is then found that a second, neighbouring tone will also excite the response (the phenomenon of irradiation). If subsequently the stimulus of the second tone is several times repeated without feeding, it not only fails to excite but becomes inhibitory. Examples of differential inhibition are easily found under conditions of war. For a man who has been exposed to shell-fire the whistle of a near-approaching shell becomes a conditioned stimulus for fear. By irradiation the whistle of any approaching shell, whether near or far, becomes effective to produce fear. With frequent repetition the sound of a shell which will be harmless ceases to excite fear, while that of a shell near enough to be dangerous is still effective. Fearlessness in relation to certain specific stimuli has thus been acquired by differential inhibition.

A fourth variety of inhibition described by Pavlov was external inhibition. This could be induced by an extraneous stimulus eliciting an unconditioned response other than salivation if this were timed to precede the conditioned stimulus. For example, an extraneous sound evoking what Pavlov called the orienting or "Where is it?" response will thus inhibit a well-established conditioned response. The analogy between external inhibition and the inhibition of one affect by another is surely a close one. Psychologists have objected that Pavlov's observations might have been recorded equally well—they would say more accurately—in psychological terms. Pavlov (1941) replied that in such an interpretation the psychologist has adopted the conventional habit of thinking of the complicated activity of animals in terms of his own feelings and thoughts. The merit of Pavlov's observations is their objectivity.

One general observation made by Pavlov (1941) relevant to the present discussion was a relationship between the type of conditioned response most easily established and temperament. In one group of dogs positive conditioned responses were relatively easily established and well preserved, whereas inhibitory responses were less easily established and more readily lost. These animals he called specialists in excitation. In another group positive responses were established with greater difficulty and were less stable; inhibitory responses were established with relative ease and were more stable. This group he called specialists in inhibition. He observed that his specialists in inhibition were invariably of a timid cowardly disposition, and concluded that there was some inherent relationship between timidity and the preponderance of inhibitory function. As an example he gives the story of a dog born in the laboratory and always gently handled but always timid and shrinking. After some difficulty positive conditioned responses were established. Any extraneous stimulus, however, would abolish the positive responses, leaving the negative (inhibitory) responses. After the Leningrad flood, in which all the animals experienced the threat of drowning, this animal lost all positive responses. They were gradually restored when the original experimenter sat with the animal with the food in the experimental room. Then a trickle of water was allowed to flow under the door; again all positive responses were lost, and had to be restored by the same means as before. This dog is described as a specialist in inhibition. Surely this interpretation is wrong. The animal was, in fact, a specialist in excitation for stimuli of a fear-evoking quality, and the excitation of fear inhibited other forms of response. This interpretation may be applied generally to the distinction between the excitatory and inhibitory types as observed under the restricted conditions of Pavlov's experiments. His specialist in excitation was a specialist of this type so far as the response to food is concerned. His specialist in inhibition was primarily a specialist in excitation so far as the fear response was concerned, and the excitation of the fear response caused inhibition of other responses.

Courage and Confidence

In the acquisition of fearlessness it is evident that courage—persistence with the task despite fear—must play an important part. Persistence despite fear implies emotional conflict. During the exercise of courage awareness of the nature of the conflict and of the emotions involved on either side may be more or less clouded by self-deception. The presence of emotional conflict is, however, manifest by a feeling of tension from which courage is inseparable. In this respect it is essentially different from fearlessness. Courage is generally regarded as the quality most highly to be prized in the soldier, and rightly so, for his duty is bound to lead him where persistence despite fear is indispensable for success; but the soldier's courage is of even greater value in enabling him to acquire fearlessness. This is what we mean when we say that the brave man learns to conquer his fears. It is the fearlessness born of courage which is the greater prize than courage itself—the state of calm rather than the state of tension. What the soldier fears is the anguish of being afraid and having to exert a degree of courage which will absorb his attention and detract from his efficiency. A man of good morale therefore will endeavour by every means to acquire fearlessness, using his courage to this end.

From this discussion of fearlessness and courage I shall now return to the consideration of confidence and loss of confidence in flying personnel. Confidence may be regarded as being compounded of different kinds of fearlessness. Many of these are of the acquired variety (for flying is *ab initio* dangerous), and their acquisition therefore calls for courage. As also experiences of an exceptionally frightening nature are common in flying, and inseparable from operational flying, these various kinds of fearlessness, which are, so to speak, the stones of which confidence is built, are often exposed to stress and not infrequently dislodged: hence loss of confidence, more or less severe according to the number of stones dislodged and their key value in the structure. Courage is again necessary for

repair. The amount of courage which a man needs to acquire and maintain confidence depends upon many factors. The most important of these are included in his pre-flying disposition and his flying experience. Let us try for a moment to imagine some of the fluctuations of confidence in an average pilot from the beginning of training to the completion of an operational tour in heavy bombers. We must suppose that he is by constitution neither exceptionally timid nor fearless. The first time he is air-borne he probably experiences slight fear. Awareness of the fact that flying is an offence against the law of gravity is, I have been told by very experienced airmen, seldom absent from the fringe of attention. Fear, however, is readily inhibited in the average person by the excitation of other affects, such as those involved in professional keenness and by the conditioning of experience. The first solo flight and the first performance of aerobatics again excite fear, which is again readily inhibited by the factors mentioned. In the course of training there are pretty certain to be other experiences of a fear-exciting kind—experiencing or witnessing crashes, death of friends, getting lost, narrow escapes of one kind and another. Most of these do excite fear, though sometimes it may be inhibited. Every time fear is excited the inhibitory state responsible for some kind of fearlessness is weakened. The exercise of courage is then called for. Experience then reconditions inhibition, and from further experience differential inhibition is developed. Meanwhile, however, there is a progressive loss of the fearlessness of inexperience; for the more flying a man has done the greater the number of things he knows which may go wrong, so that with experience the number of situations that are potentially fear-exciting increases, with a correspondingly greater demand upon inhibition for the preservation of confidence. The balance at rest, so to speak, between central excitatory and central inhibitory states becomes more and more in favour of the former. For this reason, even under the relatively harmless conditions of civil aviation, when a man has flown long enough confidence tends to wane. This has been emphasized by Armstrong, and the neurosis which results from the effort to continue flying despite loss of confidence is, I think, what Armstrong (1939) has called aeroneurosis. Our hypothetical pilot, however, will not have flown long enough for this. When he reaches the operational training unit there are new dangers to be met arising from the length of trips and bad weather, and at the same time greater stress from fatigue. Now he embarks on his operational career to meet a whole series of fresh hazards. It is certain that these will test his courage, and possible that before the end of the tour the exercise of courage must be continuous, with inevitable tension and strain. So long, however, as he can make use of courage to conquer fears, and by this and other means can preserve his confidence, tension and strain will be diminished, efficiency will be augmented, and he will have courage in reserve to balance exceptional stress. What are the new factors which assail and support confidence in this phase of the airman's career? On the one hand are all the hazards of flying over enemy territory to a target which he knows will be defended by flak, searchlights, and night fighters, new dangers of weather involved in the length of trips, and the risk of bad visibility on return. There is also the effect of casualties. At first he is protected to some extent by the fearlessness of inexperience and by the inhibitory effect of curiosity upon fear. After the first few sorties this protection is lost. This is a critical point in the tour for confidence. As the tour goes on the more stable fearlessness of experience grows, but further experience adds to the number of conditioned fears which need to be inhibited if confidence is to be maintained. The strain of anticipation consequently increases, and the prolonged wait for a sortie cancelled at the last minute is almost as much of a strain as an actual trip. Fatigue, physical and occupational, is an additional factor weakening inhibition, and lack of sleep during periods of intense operational activity operates in the same direction. On the other side there are new factors which help to inhibit fear. High among these ranks squadron and crew morale.

Our pilot, then, having lost the fearlessness of inexperience, finds other sources of fearlessness to support his confidence, but towards the end of the tour a number of factors conspire to weaken the inhibition of fear. There is the increase in the number of conditioned fears resulting from the unpleasant experiences which he must by now have had; there is the anticipation of relief from strain, and of holiday, which sometimes of a sudden makes life precious and fear insistent; and there is the effect of cumulative fatigue. For all these reasons the structure of confidence tends to become weakened and the call for courage greater. I do not imply that at any time during the tour there has been no demand upon courage. On the contrary, distinguished men of great operational experience have told me that fear, especially before a trip, generally calls for conscious control; but once the sortie has begun there is no fear in excess, and relatively little tension. There is, however, enough tension always, in most men, to cause that fatigue which we are all aware follows a prolonged effort to control emotion. There is reason, from clinical experience, to suppose that the effects of this kind of fatigue are cumulative. For example, a fighter pilot who had won the D.S.O. and D.F.C. and bar was observed by an experienced medical officer to be becoming tense and irritable by contrast with his normally good-tempered disposition. In this instance the suggestion that he needed a rest was disregarded; but later he reported sick, confiding that for several months he had been aware of a conscious effort to control fear while on operational flights. The need for this effort gradually increased, and it was a greater strain to preserve his composure. He had good insight into his condition, arguing that real courage was the ability to overcome natural fear in the presence of danger, but had reached a point when he felt suddenly exhausted.

Lack of Confidence

I have already referred briefly to the effect of a crash with injury in weakening fearlessness and undermining confidence. Several factors operate here besides the crash: there is the fact of being hurt; the opportunity for fear to increase with reflection; and the absence from flying, which by itself can impair confidence. The man who is able to fly again soon after a crash is better placed. Here is the self-revealed story of a fighter pilot who crashed and suffered a head injury and a fractured vertebra, with satisfactory recovery from both. He was sent back to duty apparently keen to fly, but after a short period returned to hospital with vague complaints of pain in his back. He was reassured, and returned to duty. A suspicion was entertained at the time that he had lost confidence, but was dismissed on his own denial; and there the story would have ended had he not unexpectedly written this letter to his physician nearly two years later.

"I can now fly and aerobat an aircraft in a way that fully satisfies me. In fact, I shall now make a confession to you. All the time I was in hospital I was scared stiff of flying. I definitely wanted to fly, but being in the air again just froze me with fright. I kept all this entirely to myself because I thought it would be put down to cowardice. Very stupid of me! When the board eventually put me back on flying, I told them I wanted to fly, when they asked me, for the same reason. I eventually did about nine hours' flying, and most of it was a complete nightmare to me. I was simply scared stiff. But again I kept it all to myself. Then just when I was beginning to overcome my fears, and at the very time when I ought to have been made to fly, I was sent back to hospital. At that time I wondered whether I could continue on with flying when I left hospital, because it meant starting all over again. After that I did about 300 to 400 hours' flying before I really felt an inclination to confidence on just ordinary level flying. Now after 700 hours I have at last got full confidence back for aerobating. When I look back now and think of the agonies I went through it all seems rather amusing. However, the point now is that I am and feel perfectly fit and confident. My back is well, and that is that."

I will now present an example of another kind—that of a sergeant air-gunner, a man of timid disposition in whom fear of flying was never inhibited. He eventually reported sick with dyspepsia, and was told by his medical officer that his symptoms were those of a neurosis, and of a kind which might be due to fear. Next day he wrote to his medical officer as follows:

"Sir,—As you know, I have during the last three or four months been suffering from, as I thought, some minor gastric disorder. This morning I was informed by you that my health is O.K.; and the probable cause of my disorder was mental, or in other words some unconscious fear. After thinking very deeply on the subject for some hours, Sir, I have come to the conclusion that you are right, but only partly so, as you hadn't the whole of the evidence.

"You no doubt have the impression that this fear has only developed over the past month or so. That is not the case. It

goes right back to the very first time I placed my foot in an aircraft. From the moment that craft left the ground I was in the grip of fear and subject to extreme nervous tension. This was not the usual feeling of uncertainty which I suppose everyone experiences on taking this step for the first time. It was real and concrete. Every moment, every bump or bank filled me, and still does, with breathless suspense, and the overwhelming desire to land and get away from it at all costs. My mental impressions to-day have not changed from those of my first flight. I still experience the same cold shivers and fears as I did then, only now more accentuated. If, Sir, these gastric pains are from the aforementioned trouble, I beg to point out that I have tried now for approximately twelve months to overcome the nauseating fear to which I am subject when flying, but, as events have borne out, so far unsuccessfully.

"The only conclusion to which I can arrive is that the trouble is not caused by temporary loss of nerve but by the gradual whittling down of the barrier I have consistently tried to erect between my temperamental equipment and the job to which I am assigned. No one has been more anxious than myself to overcome this complex, because not only has it been a severe blow to my personal pride, but also I have the same abhorrence as I suppose all persons have to being alluded to as 'yellow' or some such designation by my acquaintances."

Although the relation of these stories has occupied some time, I could not without the aid of introspective accounts have illustrated the factors which influence the development of fear and fearlessness in flying personnel. It is to be observed that in none of these cases was there any lack of courage. One of the problems with which the Air Force doctor must be confronted from time to time is the distinction between lack of confidence and lack of courage. That there is such a distinction to be made I hope I have shown. How far a man must be expected to persist in the endeavour to conquer fear is a matter to be decided not by the doctor but by those who face the dangers of operational flying themselves. The principle is that which obtains for all combatant troops. There is, however, a special aspect of the problem for flying personnel, for the state of tension inseparable from the exercise of courage becomes sooner for them a drag upon efficiency. There may come a point for some when, whether they are to be judged medically sick or sound, they are no longer efficient. Whether they are to be disposed of then as brave men or as lacking in moral fibre must be left to the judgment of their peers. The severity of this judgment is a reflection of morale. Severity does not imply lack of sympathy. The distinguished leaders who have spoken to me of their own experiences have often dwelt upon the pain of fear in excess. They have also dwelt upon the happiness and satisfaction of fearlessness, with insight into the means by which in their own case it has been obtained. A fighter pilot who had previously flown light bombers in the Battle of France said that during this time he hardly ever saw targets or the effect of his bombs. After a while he was so frightened that he sweated every time he got into an aeroplane, and could not sleep. Later, in Hurricanes in the Battle of Britain, he found —these are his own words: "Success in the game is the great incentive to subdue fear. Once you've shot down two or three the effect is terrific, and you'll go on till you're killed. It's love of the sport rather than sense of duty that makes you go on without minding how much you are shot up." This young officer was severely wounded in combat, but after his recovery went on to destroy many enemy aircraft, win several decorations, and command his squadron.

Here is a case in which the fighter job discovered an affective response which easily inhibited fear. It is an example of that chance matching of stimulus pattern with innate tendency upon which the foundations of confidence are sometimes built.

Conclusion

In this brief view of the human response to flying stress I have dwelt much on the psychological factors, because in the last war they were somewhat obscured by uncertainty about the effects of anoxia and are now more easily discerned. The analysis has led to a somewhat detailed discussion of fear and fearlessness, and to the conclusion that the emotional tension resulting from the prolonged exercise of courage is the most important element of stress. This does not exclude the presence of other important factors which deserve consideration. Skill fatigue in the pilot is one, and has been notably studied by Bartlett (1943), who has shown that loss of emotional control and abnormal behaviour may be prominent among its symptoms. Fatigue of vision and of hearing, the effects of acceleration and decompression, and even to-day under certain conditions anoxia, also play their part, and all may contribute to central nervous disorder. There are, therefore, effects of flying stress which the clinician will only see truly when he is guided by the psychologist and the physiologist, who in their turn may profit from clinical observation. In the study of the human response to flying stress collaboration of this kind is essential.

My acknowledgments are due to Air Marshal Sir Harold Whittingham for permission to use for these lectures material collected under his direction; to all my colleagues of the Royal Air Force Medical Service who have contributed to and encouraged the work, especially Air Commodore H. L. Burton for his guidance, and Squadron Leader Denis Williams, R.A.F.V.R., for his constant collaboration; to Prof. F. C. Bartlett, F.R.S., for advice and criticism; and, not least, to the General Duty Officers of the Royal Air Force for their invaluable co-operation.

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ADVANTAGES OF A DISODIUM-CITRATE-GLUCOSE MIXTURE AS A BLOOD PRESERVATIVE*

BY

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AND

P. L. MOLLISON, M.B., M.R.C.P.

In another communication (Loutit, Mollison, and Young, 1943) the advantages resulting from the use of certain citric-acid-sodium-citrate-glucose mixtures as preservatives for stored blood are reported. In assessing the preservative value of these and other recommended solutions the chief criterion adopted was the survival *in vivo* of transfused red cells which were stored in the various solutions. By this test the citric-acid-sodium-citrate-glucose mixtures were found to be definitely superior to the standard M.R.C. (1940) trisodium-citrate-glucose mixture and slightly better than the Rous-Turner (1916) solution. Moreover, these acid solutions had the additional advantage that they could be autoclaved entire with but little or no caramelization, whereas to avoid this with the M.R.C. and Rous-Turner solutions the glucose and the alkaline trisodium citrate have to be autoclaved separately and later mixed aseptically.

Of the acid solutions tested, however, all had minor disadvantages. Only one solution developed no caramel at all on autoclaving, and this solution was rather deficient in citrate ion, so that clotting of the blood was not infrequently observed. With the other solutions, which contained more citrate, a certain amount of caramelization occurred on autoclaving. This could be prevented by increasing the amount of citric acid in the

* A Report to the Medical Research Council from the South-West London Blood Supply Depot.

mixture, but then increased haemolysis of the blood occurred during storage. It has therefore been necessary to continue the trial of acidified citrate–glucose mixtures to find one that satisfies more completely the following criteria: (1) improved preservation, as judged by survival tests *in vivo*, on comparison with the present standard M.R.C. solution; (2) absence of caramelization on autoclaving; (3) a content of citrate ion adequate to prevent clotting even when the blood is not perfectly mixed with the solution during taking.

From among many possible suitable formulae the one selected for trial was:

100 c.cm. of 2% disodium citrate (monohydric)
20 c.cm. of 15% glucose (or 10 c.cm. of 30% glucose)

for admixture with 420 to 430 c.cm. of blood. This mixture, autoclaved in the standard M.R.C. bottles, with caps loose, at 20-lb. pressure for 30 minutes in the standard vertical, gas-heated, air-jacketed autoclaves supplied to the War Emergency Blood Transfusion Services, gives a colourless solution. Disodium citrate, moreover, has one other practical advantage over citric-acid–trisodium-citrate mixtures in that a single substance only has to be weighed.

Methods

Blood from healthy donors of Group O was taken into the above solution and stored at 2° to 6° C. for 20, 28, or 45 days. On the day of the test transfusion a concentrated cell suspension was prepared by removing the bulk of supernatant plasma from two bottles of identical age and pooling the packed red cells. Patients of Groups A and B whose anaemia was thought not to be due to haemorrhage or haemolysis were chosen as recipients. The transfusion was usually completed in 60 minutes. Venous samples were taken before transfusion, 5 minutes after transfusion, and thereafter at convenient intervals (usually 24 hours, 7 days, 21 days, and 60 days). The number of surviving donor cells was estimated after carrying out differential agglutination by Dacie and Mollison's modification (1943) of Ashby's technique. In every case a pre-transfusion sample was tested, and the small number of unagglutinated cells found was subtracted from all subsequent counts of unagglutinated cells.

In order to determine the efficacy of the solution as an anticoagulant an examination was made of the number of clots found among the red-cell sediments of bottles that were being used for plasma production. The red-cell sediments were passed through four layers of gauze, and any clots found were weighed wet. A similar test was made of blood stored in two other solutions—namely, Murray's solution (1943), and a mixture of 90 c.cm. of 3% trisodium citrate, 10 c.cm. of 3% citric acid, 10 c.cm. of 30% glucose with 430 c.cm. of blood (solution No. 2, investigated by Loutit, Mollison, and Young).

Results

Two patients received blood stored for 20 days, 7 patients received blood stored for 28 days, and 2 patients received 45-day-old blood. To make a direct comparison, transfusions of blood stored for 28 days in the present standard M.R.C. trisodium-citrate–glucose solution were also given to 5 patients, and survival was estimated. The results are shown in the accompanying Table, and for comparison some of the results obtained in two previous trials are included.

Solutions	No. of Cases	Time of Storage (Days)	% Survival			
			24 Hrs.	7 Days	21 Days	60 Days
M.R.C.*	15	0–4	104	101	86	49
M.R.C.*	4	20 (av.)	80	65	46	10
Disodium-citrate–glucose	2	20	92	87	83	50
Other citric-acid–sodium-citrate–glucose mixtures†	4	20	90	79	62	31
M.R.C.	5	28 (av.)	45	22	10	—
Disodium-citrate–glucose	7	28 (av.)	81	74	59	25
Other citric-acid–sodium-citrate–glucose mixtures†	8	28 (av.)	91	82	64	33
Rous–Turner*	4	26 (av.)	83	78	50	12
Disodium-citrate–glucose	2	45	46	31	20	—

* From Mollison and Young (1942).
† From Loutit, Mollison, and Young (1943).
"M.R.C." stands for the present standard trisodium-citrate–glucose mixture.
"Disodium-citrate–glucose" is the solution under trial.

When the figures for blood stored for 28 days in this disodium-citrate–glucose and the M.R.C. mixtures are compared, the striking superiority of the former solution is clearly shown. For instance, 7 days after transfusion 74% of erythrocytes stored in the disodium citrate mixture are surviving, compared with only 22% of the erythrocytes stored in the present trisodium citrate solution.

Clot Formation.—Sediments (1) from 196 bloods stored in the disodium mixture, (2) from 132 stored in Murray's mixture, and (3) from 198 stored in "solution No. 2" were filtered. The numbers and weights of the clots were as follows: (1) 196 bloods, 27 clots, total weight 355 g.; (2) 132 bloods, 34 clots, total weight 894 g.; (3) 198 bloods, 5 clots, total weight 22½ g.

Discussion

As will be seen from the Table, the survival of blood stored in the solution under trial is far superior to that of blood stored for an equivalent period in the present standard M.R.C. solution. From the point of view of survival, blood stored for 45 days in the disodium-citrate–glucose solution compares favourably with blood stored for only 28 days in the present standard citrate–glucose mixture, and blood stored for 20 and even for 28 days in the disodium citrate solution is not greatly inferior to fresh blood as a source of viable erythrocytes.

The only disadvantage of the disodium citrate solution is its liability to permit clot formation if the blood is not carefully mixed with the solution during taking. Maizels (1943) has calculated that 10 mM. of citrate in the final citrate–glucose–plasma mixture is adequate to prevent clotting with moderately energetic rotation of the tilted bottle. 420 c.cm. of blood diluted with 120 c.cm. of Murray's solution contains only approximately 10 mM. citrate, and it is therefore not surprising that clotting sometimes occurs; the present disodium citrate mixture, however, contains double this quantity, and careless taking is thus probably responsible for the large number of clots found in the present test. With care it should be possible to avoid clot formation completely. Using a modified technique in the collection of blood, the following results have been obtained: 75 bloods stored in the disodium-citrate–glucose mixture gave 5 clots, total weight 75 g.

Summary

A mixture of 100 c.cm. of 2% disodium citrate with 20 c.cm. of 15% glucose (to be added to 420 to 430 c.cm. of blood) has two advantages over the present standard trisodium-citrate–glucose mixture as an anticoagulant and preservative solution for blood storage: (1) Its preservative power, judged by the survival *in vivo* of erythrocytes stored in the solution, is considerably superior; (2) the mixture can be autoclaved entire without the production of any caramel.

The mixture, however, contains less citrate radical than the standard trisodium citrate solution, and greater care must be taken to secure thorough mixing of blood and solution if clot formation is to be avoided.

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L. Chargin, N. Sobel, and H. Goldstein (*Arch. Derm. Syph.*, 1943, **47**, 467) record an epidemic of erythema infectiosum in a New York City orphanage from Nov. 4, 1941, to April 11, 1942. There were 80 primary attacks, and 90 relapses numbering from one to six. The severest attacks were among girls. In 64.7% the eruption was limited to the face, in 2.3% it was confined to the body, and in 33% both the face and the body were affected. Infants and children between 1 and 4 years were relatively immune. The incubation period was from one to twelve days.

PROGRESSIVE CEREBRAL ISCHAEMIA

BY

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Elderly people who are beginning to "fail" often show changes in mentality or behaviour as the first sign of their deterioration. During the last two years a number of such patients have been studied at the Royal Hospital, Chelsea. Among them were two groups of cases which seemed to be associated with the presence of cerebral ischaemia. One of these, in which the condition remained stationary, appeared to correspond to the "relative hypotension" of Stieglitz (1935). This was one of the commoner forms of senile dementia. The other, described below, was progressive through three distinct stages to a fatal termination.

Clinical Picture

Of the 27 patients in this series all but two were Chelsea pensioners. Their ages ranged from 70 to 87. Fifteen had but recently recovered from an infection of the respiratory tract; 14 were suffering from congestive heart failure, which followed bronchitis or bronchopneumonia in 7 of them; 9 had had previous cerebral thrombosis; 1 had infection, cerebral thrombosis, and heart failure; while 1 had no known predisposing factor apart from hypertension.

TABLE I.—*Predisposing Factors*

Recent infection	15
Congestive heart failure	14
Previous cerebral thrombosis	9
Infection and heart failure	7
Heart failure and cerebral thrombosis	4
Infection and cerebral thrombosis	4

The first change to be noticed was a vague or muddled state of mind in a patient previously lucid. Thought processes became irregular and sometimes delusions appeared. These might be of persecution by members of the staff or others, but often concerned the price of articles. For instance, one man asked for £150 to buy a pipe and tobacco; another patient watered an imaginary garden with his urinal; while a third sprinkled his pudding with tobacco. Failure to recognize friends or relatives was also common. Members of the hospital staff might be addressed as brothers or sisters in error. At this stage the blood pressure was high in most of the cases recorded, but not so high as the previous normal. A fall from 230 to 170 mm. or from 205 to 195 mm. was the type of change noted.

After this came a stage of restlessness, often going on to violence, and usually worse at night. The most characteristic feature was a desire to get in and out of bed without reason. Automatic resistance to nursing or treatment was common.

In some cases the clinical picture resembled the condition known as "cerebral irritation," seen after head injuries. Two patients in this stage had to be sent to a mental hospital, but died in cardiac failure soon afterwards. The blood pressure in this phase was definitely lower than before, varying from 150/100 to 110/70 in patients previously hypertensive.

As the restlessness passed off the pulse became perceptibly weaker and the patient drifted into a terminal coma at systolic pressures between 120 and 75 mm. Diastolic pressures were always hard to determine at this stage, but one man showed 95/80 mm. as his last reading. His original figures were 180/90 mm. Another patient lingered for three days with no pulse palpable below the elbow, although his previous level had been 230/110. At this stage it was usual to find peripheral cyanosis and evidence of circulatory stagnation.

TABLE II.—*Symptoms and Blood Pressure (in mm.) of Typical Cases*

Case	Usual B.P.	Muddled or Delusional	Restless or Violent	Comatose	Duration
5	?	120/90	110/80	95/?	28 days
6	?	190/90	110/70	?	5 days
9	?	140/90	110/80	75/?	1 month
11	205/140	195/100	130/80	105/60	13 days
15	230/110	170/110	?	brachial 0	2½ months
18	?	180/120	150/100	120/80	5 weeks
21	180/90	160/90	130/80	95/80	2 months
24	180/90	150/80	130/70	110/60	2½ days
25	225/130	150/100	130/100	110/?	1 month
26	?	180/110	150/90	100/60	9 weeks
27	?	170/90	140/80	110/?	5 weeks

Discussion

The first cases in this series came to notice because their condition relapsed after apparently successful treatment. For example, patients with bronchopneumonia cured by sulphapyridine returned in congestive heart failure. This was treated by administration of digitalis and injections of mersalyl, which removed the oedema; but the patients showed the succession of mental symptoms described, and died in spite of all efforts. It was then observed that many of them had been previously hypertensive or showed cardiac enlargement suggesting past high blood pressure; so readings were taken at intervals. Unfortunately enemy action destroyed many of the earlier records.

The relation between a falling blood pressure and the appearance of cerebral symptoms in arteriosclerotic subjects suggests that progressive cerebral ischaemia is the basic pathology. This was mentioned by me in a communication (Howell, 1941) on the subject of heart failure in the aged. Subsequent cases, with more detailed study of the arterial tension, have gone to confirm this. Successive ischaemia of cerebral cortex, hypothalamic area, and medulla would be likely to give the symptoms described. Owing to the fatal outcome of this syndrome its recognition is of some prognostic importance to the practitioner.

Conclusions

A series of cerebral symptoms occurring in 27 senile patients is described. A progressive fall in blood pressure accompanied the symptoms in every case which had such readings taken. It is suggested that the symptoms were caused by progressive cerebral ischaemia. The invariably fatal prognosis of this syndrome is stressed.

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CONGENITAL ABSENCE OF THE VAGINA TREATED SUCCESSFULLY BY THE BALDWIN TECHNIQUE

BY

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Operations for the treatment of congenital absence of the vagina have been performed since the end of the last century. The basis of these operations was dissection of the recto-vesical space, and lining by epithelium or endothelium of the cavity thus produced. Heppner (1892) used skin from the thigh; Pozzi (1908), flaps from the labia; while Thiersch grafts, pinch grafts, or peritoneum have been employed by others. Wharton (1940) merely dissects the recto-vesical space and inserts a rubber-covered mould, which is worn for about four months. He claims that by the end of that time epithelium has grown up from the orificium to line the cavity. He states that contracture has not occurred in any of 11 cases done by his method. This is difficult to understand, as contracture is the bane of all operations where bowel is not employed.

Snegireff (1904) used the rectum to replace the missing organ, and a modification of his operation was designed by Schubert (1911, 1912). In the modern construction of the vagina from bowel a loop of pelvic colon or ileum is employed. Baldwin (1907) was the first to describe the technique of using small intestine. His operation was performed in the case described below.

Clinical History

The patient was aged 25, had been married two years, and complained of primary amenorrhoea. Her secondary sex characteristics were well developed and her libido was normal. She was mentally depressed owing to her deformity. Examina-

tion showed a normal pudendum, except that the vagina could not be found. On rectal examination the ovaries could be felt, but the uterus was not palpated. Intravenous pyelography showed that the kidneys were normal in position and function. The patient was extremely anxious for operation and willing to accept its limitations.

Report of Operation

The operation was performed in July, 1942. The patient was placed in the lithotomy position and the recto-vesical space dissected up to the peritoneum. A long tissue forceps was put in the cavity and the Trendelenburg position adopted for the second stage of the operation. The abdomen was next opened by a right paramedian incision; the ovaries, tubes, and round and broad ligaments were present, and looked normal. The appearance was as if a total hysterectomy had been performed. The lowest loop of the ileum was "measured" over the pubis. This loop was excluded from the intestinal tract by dividing the bowel between clamps, about six inches from the ileo-caecal valve, and again about ten inches higher up. The ends of the separated loop were closed and its mesentery was mobilized for about two inches, care being taken that its blood supply was not jeopardized. Bowel continuity was restored by end-to-end anastomosis. Aided by an assistant pushing on the forceps, the peritoneum in the pouch of Douglas was divided. The forceps was made to seize a ligature passed through the centre of the mesentery of the loop, and the assistant pulled forceps and loop down. This was the most difficult part of the operation, and could only be done when the Trendelenburg position had been abandoned. The peritoneum was sutured over the ends of the loop and the abdomen sewn up in layers. The lithotomy position having been again adopted, the convexity of the loop was sutured to the orificium and opened. A corrugated drain was left in the recto-vesical space for 24 hours.

The patient stood the operation well; the spur was crushed after three weeks and again a week later. She left hospital six weeks from the time of operation. The vagina was now four and a half inches long and admitted two fingers. Her stay in hospital was prolonged because of superficial infection of the abdominal wound. She was seen again in six months: her cheerful attitude towards life was a striking change. The vagina had not contracted, and she had no noticeable mucous discharge.

Conclusion

One case of congenital absence of the vagina treated successfully by the Baldwin technique is described. When uterus and ovaries are normal there can be no question as to the propriety of operation. In the type of case described above it is felt that operation is justifiable if the patient is married or about to marry, if her attitude towards sex is normal, and if she is willing to undergo an operation of some severity.

From absence of personal experience, no comparison is made with other methods of treatment. It may be said, however, that the vagina constructed by this method shows no disposition to contract, is lined by mucous membrane, and on bimanual examination is almost indistinguishable from the normal vagina.

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W. I. Daggett (*J. Laryngol. Otol.*, 1942, **57**, 427) describes a condition of desquamative otitis externa which is rarely if ever seen in Great Britain, but is well known in hot humid climates such as Malta, where he has seen 164 cases. The incidence is seasonal, the disease being very common in the summer and virtually disappearing in the winter. The chief characteristic is desquamation lining the deep bony meatus. The commonest bacteriological findings are diphtheroids plus *B. proteus*, and diphtheroids plus *B. pyocyaneus*. Treatment consists in careful cleaning, astringent wicks, and powder insufflation.

Medical Memoranda

Two Cases of Congenital Absence of One Kidney in the Same Family

Although congenital absence of a kidney is not rare enough to warrant the reporting of a case—A. R. Stevens (1937) estimated its occurrence as about 1 in 1,000—two cases in the same family are of interest in suggesting that the condition may be hereditary. More than one case in a family does not appear to have been recorded before: Ballowitz (1895) gives a summary of 210 cases, and reports 3 new ones, but no mention is made of the condition being familial or hereditary.

Case Report

The patient, a boy aged 8, was sent for investigation because albumin had been found in the urine at a routine pre-operative examination. He was in good health, and had no symptoms referable to renal disease. He had had a tonsillectomy at the age of 6. The mother's uncle was known to have had "kidney trouble."

On examination the boy appeared well. Neither kidney was palpable. The heart was normal, and the blood pressure 110/70. The urine showed no albumin at any time, even after the boy had been up and about. Microscopy of the urine revealed a very occasional pus cell and red blood cell, but no casts. The blood urea was 42 mg. per 100 c.cm. The urea clearance was 103% of the average normal. An intravenous pyelogram showed a large but normal left kidney in a normal position, but the right kidney outline was not visible and there was no visible secretion from it. Cystoscopy revealed a normal left ureteric orifice, but no right ureteric orifice was visible. The interureteric bar was seen up to the midline, but no sign of it was present on the right side. No other congenital deformity was found.

Further inquiry about the condition of the mother's uncle was then made, and it was found that two intravenous pyelograms had failed to reveal any kidney on the right side, the left kidney being large, with normal outline of the calices, pelvis, and ureter. The absence of the right kidney was confirmed by palpation during an appendicectomy.

The occurrence of the identical abnormality in two members of the same family suggests that the condition may be hereditary, and is a stimulus to search for more such cases.

I have to thank Dr. W. J. Pearson for permission to publish this case, and Mr. F. J. F. Barrington for doing the cystoscopy.

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Sealing Intratracheal Catheters, and a Listening-tube

I have tried various ways of sealing intratracheal catheters in position to prevent loss of cyclopropane through leaks and to gain control of intrathoracic pressure, and for some years have relied, except for operations in the mouth and some others entirely on the following:

1. The soft parts about the glottis—the base of the tongue, epiglottis, aryepiglottic folds, etc.—are themselves pressed into service to occlude the space where leaks occur. This is done by approximating them to the posterior wall of the pharynx by tying the chin back with two turns of bandage, and is facilitated by the phenomenal relaxation of the jaw under cyclopropane. The method has the advantage of being very simple and efficacious, and it is harmless. The use of packing is avoided, and the only care needed is to keep the tongue, which is protruded from the half-open mouth, moist. Moreover, an ordinary Magill catheter is used, whereas an inflatable cuff, when wrinkled, may impede blind intubation. In some patients the face becomes congested.

2. It is a great help to be able to hear the breathing well, and in cases which have been intubated but not connected to a breathing-bag I cut a piece of rubber tubing, a few inches long by 3/8 in. diameter, to use as a listening-tube in the following way: Near one end a slit 3/8 in. long is made, and diametrically opposite to this a piece is cut out of the wall with scissors, leaving a large hole; the other end is cemented with rubber solution on to a length of tubing of smaller diameter for conveniently holding to the anaesthetist's ear. The slit is slipped over the collar of a Magill metal connexion, and so the breath goes in and out past the hole. It can be most clearly heard, and has been much appreciated by students, who are thus enabled to heed every change in the breathing.

K. B. PINSON, M.R.C.S.

Reviews

INDUSTRIAL MEDICINE

The Principles and Practice of Industrial Medicine. By 32 authors. Edited by Fred J. Wampler, M.D., Professor of Preventive and Industrial Medicine, Medical College of Virginia. (Pp. 579); illustrated. $6.00 or 33s.) Baltimore: The Williams and Wilkins Company; London: Baillière, Tindall and Cox. 1943.

This is an extremely timely textbook, and is admirably written by 32 authors—each an expert on his own branch of work. Industrial medicine is a subject whose importance has been adequately recognized only since the present war began. Comprehensive textbooks are few, and therefore this excellent one should be greatly appreciated both by industrial medical officers and by students. Unfortunately legal and compensation matters are not identical in the United States and Great Britain, and therefore in this country it is not a book of reference on these subjects, However, practice runs to a great extent parallel, and this does not detract greatly from its value for the student. It begins by giving an excellent account of the place of the physician in industry; there is a very sane discussion on relations with management, supervisors, foremen, and workers. This is followed by the position of Governmental agencies in industrial hygiene. The full importance of environment is recognized by chapters on temperature, humidity, atmospheric pressure, lighting, and ventilation. The survey of substances which cause occupational poisoning is first-rate. The relation of gradations in degree of toxicity to the periodic classification is stressed. Kehoe gives the benefit of his experience in a chapter which is an up-to-date review of the present state of our knowledge of lead poisoning. Chapters on solvents and dust diseases complete the section devoted to occupational diseases. It is noticeable, however, that no mention is made of byssinosis, or diseases resulting from the use of compressed-air tools.

The last part of the book is devoted to prevention, trauma, and rehabilitation, all of which are admirably discussed, though it is surprising that only one short paragraph is devoted to a discussion of the place of mass miniature radiography in detecting the early case of pulmonary tuberculosis. Diagrams and illustrations are scattered throughout the book, and each chapter has a comprehensive bibliography. In general this is an excellent pioneer textbook which should be of much value in redressing the balance of medical education. We hope that it will have a great success and will be extensively read. Its sins are those of omission, which are almost inevitable in such a pioneer book, and will doubtless be corrected in future editions.

DISEASES OF THE BREAST

Diseases of the Breast: Diagnosis, Pathology, Treatment. By Charles F. Geschickter, M.D. With a special section on treatment in collaboration with Murray M. Copeland, M.D., F.A.C.S. (Pp. 829; illustrated. 72s.) London: J. B. Lippincott Company. 1943.

The author of this important volume is a pathologist of high distinction, especially in the field of experimental pathology of tumours and their relation to endocrines. To this experience he has added a study of cases seen in the wards of Dean Lewis at Johns Hopkins Hospital and of the case-histories, specimens, and follow-up studies recorded in the surgical laboratory of Johns Hopkins and therefore largely the work of Halsted, Welch, and Bloodgood. It is from its pathological aspects, and still more from its account of experimental pathology, that the book derives its importance, and it would, perhaps, have made for clearness if the author had separated the laboratory methods, of which he is a master, from the clinical aspects of the subject, which might well have made a special study.

The opening chapters deal with the development and physiology of the breast, especially in relation to endocrines, and here the author has made full use of his wide experience in the mammary evolution of the rat and the monkey. This is followed by an account of mammary hypertrophy, of puerperal changes, and of chronic cystic mastitis, which is discussed at great length and with full reference to experimental work on animals, and this is followed by well-illustrated chapters on non-malignant tumours.

One-half of the volume is rightly devoted to cancer of the breast, and from the pathological and experimental points of view this is certainly the most important part of the book. When, however, actual treatment is taken up there are numerous statements with which we cannot at all agree, and which would seem to us to be entirely out of date; for example, no one nowadays thinks it necessary to remove large portions of skin, nor when a surgeon undercuts the skin would he regard sloughing as even a distant possibility. The problem of irradiation is discussed at considerable length, but one would have welcomed a fuller critical account of its advantages and disadvantages or of the complications which may arise. The volume concludes with chapters on the experimental production in animals of chronic cystic mastitis and of cancer by the injection of oestrogen and hormones.

It will be seen that the book is essentially a pathological review for the study of the expert who wishes to make himself fully acquainted with the results of experimental methods, combined with an analysis of a large amount of clinical material left by surgeons who were leaders of their time. It is superbly illustrated, and each section is provided with full bibliography.

MENTAL HEALTH OF UNDERGRADUATES

Mental Health in College. By Clements C. Fry, M.D., with the collaboration of Edna G. Rostow. (Pp. 365. $2.00 or 11s. 6d.) New York: The Commonwealth Fund; London: Oxford University Press.

Nearly 20 years ago the authorities at Yale University had heart-searchings because while so much was done for the intellectual and physical well-being of their students little was done to help their general adjustment to a new life. A college community in the United States is a rather formidable new world for some to face, as the life is highly organized and competitive. "With its residential colleges, fraternities and senior societies, its numerous student activities and high scholastic standards, Yale is a community which makes insistent demands upon its members." A department of psychiatry (using that word in its wider American sense) was therefore instituted to help students to make adjustments to it. At first a survey of all entrants was attempted, but, as might have been anticipated, the results were incommensurate with the labour involved. Then students in difficulty were referred by their teachers to the department or came of their own accord. Naturally, the best results were achieved among those who came willingly. This book is a statement of the observations made and conclusions reached. Typical problems are considered in turn—difficulties with family relationships, sex, scholastic achievement, social adjustments, and so on. Case histories are embedded in the text. Frankly, we do not think this is the best plan. Seldom does one of these causes exist in isolation; they are generally interwoven. Thus there is a good deal of repetition which is accentuated by the monotonous similarity of the case histories. A more general discussion, with the case histories relegated to an appendix to which references could be made by way of illustration, would have increased the pleasure of reading the book without detracting from its value as a record. Nevertheless many interesting results emerge.

It is not surprising that the parental relationship bulks so largely in these discussions. As Otto Rank said, the detachment of the growing personality from the parents is one of the most essential stages, as it is the most painful, in development. Between dependence on the security and affection of the home on the one hand and subjugation by parental domination on the other, many a young life is faced by a veritable Scylla and Charybdis. Moreover, domination is not always harsh; even more often it is affectionate, but too intrusive. In the present volume we meet with many instances of an old Yale man urging, from loyalty to his alma mater, an academic life on a son who is completely unfitted for it. "Broken homes" present another aspect of this problem. Desire for social acceptance seems an extraordinarily potent influence at Yale; fraternities abound which are governed by strict ritual and surrounded by an atmosphere of special secrecy and solemnity. Failure to obtain election to the desired one often seems to have a very depressing effect on the aspirant. This is quite unlike the informal clubs abounding in our universities, which no one, either inside or outside them, takes very seriously. As to problems arising from scholastic difficulties, it is surprising to learn that in the first year more than

20% have to drop out because they fail to reach the intellectual standard required; between a quarter and a half of these cases were due to insufficient earlier education, but in the remainder the pre-college record had been satisfactory. This surely suggests too intensive pressure is exerted on them.

A comparison of the reactions in the various faculties gave interesting results. The divinity students are of a higher average age but of poorer financial status. It is the fundamentalists finding themselves in a more liberal atmosphere who chiefly provide the problem cases. The medical students are given more opportunities of developing their own initiative, and the authors are surprised, though we are not, that this appeared to diminish difficulty of adjustment. Such difficulties were chiefly among those who found they had chosen the wrong vocation. Curiously enough the medical students were the group to show the most resistance to psychiatry. The law students, again an older group, showed the greatest uniformity of symptoms, which were generally those of an anxiety state centred on the gastro-intestinal tract.

Now that Yale has adopted the residential system it becomes of interest to compare experiences there with those of the older universities in this country. On the whole their students enter younger, and in the majority of cases ours have already become more detached from home influences at boarding-schools. Nor have we to deal with considerable numbers of the sons of foreign immigrants, to whom a Yale degree represents prestige and yet more difficulty in social adjustment. It would also seem that the atmosphere is more fiercely competitive than here. It may be that we are apt to be too complacent in our view that adolescence is a condition which soon cures itself, and are rather reticent about probing the personality of others. Nevertheless there are grounds for believing that psychoneuroses are less common in undergraduates in England than in the States. Probably the recent generations are more subject to them than their fathers, who were brought up with a stable background which imparted a sense of security. State scholars are sometimes a problem, when a well-meaning local authority insists on sending up students who are unsuitable. These do not like the university life and yet become dissatisfied with home conditions; they swell the third class and find it difficult to fit into life afterwards. Both at Yale and here the conclusion seems to be that a university career is not for all. As a parodist of the Grand Inquisitor's song in "The Gondoliers" wrote:

> "For no one is of high degree
> When everybody's got one."

Notes on Books

Vol. II of the new series of *Clinics* published by Lippincotts contains a symposium on haemorrhagic states, blood substitutes, and the management of haemolytic states, as well as a review of haemoglobinuria. In addition there are articles on such widely different topics as meningitis, fibrositis, burns, and abortion. The reviews are competently written, but it is a little difficult to know to whom they are addressed. The haematological subjects have already been reviewed *ad nauseam* and there is little significant recent progress to report. The material is perhaps too detailed for the practitioner and not fundamental enough for the researcher. It is also probable that the articles on blood banks and burns would not be regarded as absolutely up to date by those working in these subjects on this side of the Atlantic. This is because much of the most important medical research of the war is still locked in the secret archives of the United Nations. The time has surely come for the authorities to consider the orderly release of some of this material, and when this happens it may well require all our present facilities for reviewing. But until then it is pertinent to ask whether American publishers are not overdoing the business of reviewing medical progress.

A pamphlet describing the steps being taken in schools and youth organizations to give sex education to children and young people has been published by the Board of Education. *Sex Education for Children and Young People* (H.M. Stationery Office, 6d.) is based on a recent survey by H.M. Inspectors and is published for the benefit of local education authorities, teachers, and youth leaders, and of parents who wish to give their children some guidance. One of the main conclusions of the survey is that far too many young people to-day are ill informed on the facts of sex and ill advised regarding their social implications. This is mainly due to the absence of sex instruction in early years by parents and subsequently in the schools. To assist parents the Board strongly urges education authorities to arrange parents' meetings with a view to securing their co-operation in everything that is done in the schools and helping them in dealing themselves with their own children. It is estimated that about one-third of the secondary schools in England make a serious attempt to give instruction. Though most secondary schools claim to offer some sex instruction, in many cases it is confined to individual advice. Some progress has also been made in the elementary schools, but the present school-leaving age is generally recognized to be a severe limitation in dealing adequately with the social and moral implications of sex conduct. The pamphlet emphasizes two main stages in sex education: (i) factual instruction in the physiology of sex (this usually forms an integral part of a normal course, such as biology or general science); and (ii) guidance to groups or individuals towards a better understanding of the sexual impulse and emotion and the moral and social problems arising from it. In the schools the first element is best dealt with through class teaching; this helps to avoid any special emphasis. It is found that it is advisable for children to receive this practical background before adolescence gives an emotional colour to the subject. Guidance on questions of conduct comes later when the child is more mature. The pamphlet stresses that simple and sensible answers should be given to children's questions from the earliest age.

Despite wartime difficulties *Recent Advances in Medicine* appears in a new edition (the eleventh), and in it Dr. G. E. BEAUMONT and Prof. E. C. DODDS continue their critical review which they began nearly 20 years ago. Nearly one-fourth of the present volume consists of new material, and certain familiar sections of various editions have had to be excluded. Physicians and practitioners will find much of interest between the covers of this book, which is published by J. and A. Churchill at 18s.

Preparations and Appliances

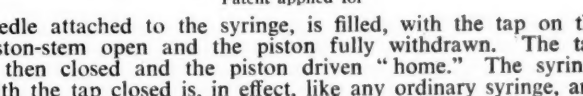
SYRINGE FOR TRANSFUSIONS AND INFUSIONS

Dr. LEONARD ROSENTHAL, senior resident medical officer, Staincliffe County Hospital, Dewsbury, writes:

The syringe here described was devised to facilitate the transfusion of blood and the intravenous infusion of plasma, saline, glucose, etc. It has been used for venesection, and should prove useful in taking blood from donors and in continuous intravenous anaesthesia.

It consists of a 1 c.cm. Record syringe the piston and piston-stem of which are hollow, being formed with a uniform bore throughout their length. Towards the end of the piston-stem is attached a tap manipulated by a small lever, while the end of the piston-stem is adapted for the fitting of rubber tubing.

In use, the syringe is connected to the reservoir of fluid to be infused and the whole apparatus, including an intravenous



⅔ Scale
Patent applied for

needle attached to the syringe, is filled, with the tap on the piston-stem open and the piston fully withdrawn. The tap is then closed and the piston driven "home." The syringe with the tap closed is, in effect, like any ordinary syringe, and is now used as in taking a blood sample from a vein. As soon as the vein is entered, shown by blood flowing into the barrel, the tap is opened and the perfusing fluid allowed to run through into the vein. The syringe is then strapped to the arm.

By the use of this syringe dissection of the vein is avoided and the same vein can be used repeatedly. Again, because the syringe is a vein-seeker there is no doubt when the needle is in the vein. This makes it especially useful when the veins are difficult to locate. Starting the transfusion or infusion is simple and can be accomplished by a finger of the same hand that holds the syringe. The glass barrel provides a "window" through which continual inspection of the perfusing fluid can be made. Any blockage of the apparatus, as sometimes occurs in blood transfusion, can be overcome without withdrawing the needle from the vein. All that is necessary is for the piston to be withdrawn to its full length, the tap closed, and the contents of the syringe injected into the vein. The opening of the tap will then restart the transfusion. This syringe has been in use for over a year for routine and emergency work, and its simplicity in both design and operation has saved a great deal of time in transfusion procedures. It may be found useful in the emergency transfusions in the field.

My thanks are due to Mr. James Walker, who made the original syringe from my design. It is now being manufactured by Chas. F. Thackray, Ltd., Park Street, Leeds, 1.

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PENICILLIN IN BATTLE WOUNDS

The Tunisian experience of which Prof. H. W. Florey gave a necessarily brief account to a crowded audience at the Royal Society of Medicine on Nov. 9 (*B.M.J.*, Nov. 20, p. 654) is fully described in a War Office Report of which we give a summary on p. 755. It appears that this report is for official circulation only; it is to be hoped that copies will reach all those who are engaged in the clinical use of penicillin, since it is by far the fullest account of this form of treatment so far written, and contains a mass of valuable information both on general principles and on details of surgical technique. The circumstances in which this study came to be made are now fairly well known. The work of Florey and others during the past two years had shown that penicillin is capable of controlling infection by almost any of the pathogenic Gram-positive bacteria which occur in wounds, and the possible applications of this fact to military surgery had clearly to be investigated as a matter of prime urgency. Clinical material in quantity was available only in North Africa, and accordingly Florey himself with Brigadier Cairns went out there for three months, and collaborated with a trained surgical team in forward base hospitals in Tripoli and Sousse in the treatment of early casualties from the campaign in Sicily. A preliminary study in Algiers of the treatment of chronic wound sepsis had been disappointing: local treatment with penicillin was often ineffective, and only prolonged systemic administration involving heavy and perhaps unjustifiable expenditure of penicillin could be relied on to bring infection under control; even this failed in some cases.

The circumstances of the Sicilian campaign were well suited for a trial of reasonably early though not immediate penicillin treatment. In a few cases treatment was in fact more or less immediate: 13 wounds were operated on in a hospital ship off the Sicilian shore, being closed after the introduction of undiluted penicillin powder—the only instances in which penicillin was used in this form. The great bulk of the cases were 3 to 12 days old on arrival at the forward base in North Africa; the majority were infected and some frankly septic and dirty, although some had been kept clean by the insufflation of pencillin–sulphanilamide powder in the forward area. With or without further insufflation, every possible soft-tissue wound, however large and regardless of sepsis, was completely closed, small tubes being left in through which penicillin solution was injected twice daily for 4 days. In the great majority all Gram-positive infection was eliminated at a small cost in penicillin; either the wound remained dry, or a benign sort of "Gram-negative pus" (containing *Ps. pyocyanea*) could be aspirated or escaped from the wound, its formation not apparently retarding healing. The other main class of case was the compound fracture; here again closure was the policy, in order to obviate chronic infection. These cases received 500,000 units of penicillin by systemic routes, a dosage which may have to be increased somewhat, especially for fractures of the femur. In these two main classes the numbers of men treated were 171 and 36 respectively. Accounts are also given of the local treatment of 23 brain wounds and 7 cases of gas gangrene.

That this study should have been compressed into a space of only three months, during which successful new methods were devised and tested on a considerable scale, is an achievement with which its authors have every reason to be well satisfied. It is said that the investigation has been criticized on the ground that it was "uncontrolled" in the sense that no parallel series was treated by other methods. A vigorous rejoinder to this comment points out that any such comparison would require a far longer period of study, and goes on to observe that in spite of four years of war there are as yet no data by which the merits of sulphonamide wound treatment can be judged. Somewhat acid comments are made on the existing lack of statistical information generally: there are no large-scale figures available concerning the frequency of wound infections or their duration, still less of the effect on them of any particular form of treatment. The appointment of statistical officers to assemble such data for both penicillin-treated and other cases is recommended. It is difficult to envisage a strictly controlled investigation, since it is repeatedly stated or implied that no surgeon would have considered closure of some of the large and dirty wounds which were treated but for the assurance that penicillin would enable him to get away with it. That there was not one disaster in consequence of this often drastic and difficult proceeding is perhaps the most encouraging single feature of the whole report. The absence of controls is also excused on the ground that penicillin treatment should not be compared with any other until its technique has been perfected. With more experience it is anticipated that methods and results will be improved.

It may well be considered that Florey and Cairns have already succeeded in their object of discovering how penicillin can be used to the best advantage in the treatment of battle wounds. The simple answer is that penicillin treatment will overcome sepsis if it can be started within a fortnight of wounding or preferably earlier, that it should be accompanied wherever possible by complete closure, and that the prospects for it are improved by preliminary insufflation with penicillin–sulphanilamide powder in the forward area. Treatment at this stage, which is feasible at any advanced base, will be far more productive of results than any attack on chronic and intractable suppuration. The recommendation that penicillin treatment be mainly confined to one theatre of operations will be commended in so far as the stuly of a therapeutic problem is concerned. But to the extent that penicillin wound therapy becomes well-founded and capable of successful general application this restriction must appear in a different light, especially if larger supplies become available. We look forward to hearing that the supply position and the availability of trained personnel permit of extending this treatment if necessary to other possible theatres of war than the Mediterranean.

PERIPHERAL BLOOD VESSELS IN HEALTH AND DISEASE

Recent groups of papers published in America testify to the continued versatility of the attack on the problems presented by the peripheral vasculature. Complicated studies are being made with elaborate plethysmographs, calorimeters, oscillometers, capillary microscopes, and capillary manometers. On the other hand there are experiments involving the triple response of the small vessels of the skin, the injection of histamine, or the production of a saline wheal, which are technically so simple that they may be carried out by any clinician. It is a field full of questions awaiting answers, where it is easy to collect data, but where the interpretation of results is extremely difficult and where all experimental methods need to be controlled rigorously.

A new technique has been elaborated by Dipalma and his co-workers[1] from the reactive hyperaemia test, used widely in this country to separate organic from functional vascular disorders. In the "ring reactive hyperaemia test," as they call it, a 500-gramme lead weight with a lower surface whose area is 5 sq. cm. is placed on the skin for a sufficient time to cause a hyperaemic area of even intensity and discrete edges after removal. This is called the "threshold time," and is an indication of the ability of the smallest vessels of the skin to respond by reactive hyperaemia. The time taken for the hyperaemic area to fade to the colour of the surrounding skin is called the "clearing time," and is an indication of the rate of the local blood flow. Many factors apart from disease of the vessels affect the response. The activity of the patient, his environment, and his diet must all be standardized, and the speed of response varies even with the season. Both the "threshold time" and the "clearing time" are shorter in the cephalad segments than they are in caudal segments, and the palm, sole, cheek, and buttocks give values below the mean. In the aged there is little change on the trunk, but on the extremities both the times are lengthened. Some attempt was made to determine the cause of the changes. It was noted that the areas of greatest sensitivity are those where the concentration of haemoglobin is proportionally highest. Induced anoxaemia and acidosis were followed by decreased sensitivity, and alkalosis by an increase. Dipalma concluded that the irritability and the blood flow of the small cutaneous vessels are related to the concentration of CO_2 in the blood.[2]

Much work continues to be done on those diseases of the peripheral vessels which cause gross nutritional changes in the tissues. When arteriosclerosis is complicated by skin lesions on the feet the ability of the small vessels of the skin to dilate after ischaemia has been shown to be normal. As was to be expected, it was found that the blood flow is reduced, which suggests that the skin lesions are related to the rate of cutaneous blood flow and not to a change in the functional capacity of the small vessels finally responsible for the nutrition of the tissues.[3,4] The digital circulation in Raynaud's disease, sclerodermia, and thrombo-angiitis obliterans has been studied in great detail with the aid of a calorimeter which makes possible an estimate of the rate of blood flow.[5] In Raynaud's disease and in sclerodermia the digital blood flow is usually decreased and the vascular resistance increased. In thrombo-angiitis obliterans the vascular resistance is normal, but the blood flow is decreased because of the low digital pressure. The results confirm the views generally held about these conditions and lead to a clearer understanding of the functional changes involved. For clinical purposes little information is obtained from complicated investigations in clear-cut cases of organic obliterative disease of the arteries except as supporting evidence. The physician can obtain the information necessary for his diagnosis by observing the nutrition and colour of the skin, by palpating the arteries, and by measuring the temperature with the back of his hand.

The dynamics of the circulation in hypertension attract much attention. Eichna and Bordley[6] have not been content with the indirect evidence that there is no change in the pressure in the capillaries in hypertension and have proved it by direct micro-injection. The first part of their report,[7] which deals with the effect on capillary blood pressure of such factors as neurogenic vasoconstriction, vasoconstriction with adrenaline, and reflex vasodilatation, is a good indication of the amount of work to be done in this field before you can begin to answer your original question. Another group of workers have measured the speed and degree of the response of the small vessels which follows sensory stimuli such as pin-prick.[8] The data suggest that in cases of hypertension the reaction time of the vessels is short and the degree of constriction greater than in normal subjects. This is, of course, merely a more elaborate way of getting at the same point reached by Hines and Brown,[9] who measured the increase in blood pressure after putting the hand in iced water. Brown and Maegraith demonstrated a similar increase in the reactivity of the blood vessels of animals after the experimental production of hypertension.[10] The digital blood flow in hypertension has again been measured,[11] this time with a calorimeter, and in essential benign hypertension it is normal. In malignant hypertension it is decreased, and the vascular resistance is increased out of proportion to the elevation of blood pressure. There is another difference between the two conditions: in benign hypertension there is a normal response to the "ring reactive hyperaemia test," but in malignant hypertension the sensitivity of the smallest vessels of the skin is greatly reduced.[4] As so often happens with a new observation, we are reminded of an old one, made more simply, and this time it is Volhard's separation of hypertensive patients into those with red and those with pale skins. Perhaps here was a lead which has been neglected because the original interpretation proved to be wrong. Now we can expect new attempts to explain the nature of this long-known difference, and there is reason to hope that they will rapidly have clinical importance.

1 *Amer. Heart J.*, 1942, **24**, 332.
2 *J. exp. Med.*, 1942, **76**, 401.
3 *Amer. Heart J.*, 1942, **24**, 345.
4 *J. clin. Invest.*, 1942, **21**, 675.
5 *J. clin. Invest.*, 1942, **21**, 547.
6 Ibid., p. 711.
7 Ibid., p. 697.
8 Ibid., p. 655.
9 *Ann. intern. Med.*, 1933, **7**, 209.
10 *J. Physiol.*, 1941, **99**, 304.
11 *J. clin. Invest.*, 1942, **21**, 539.

TREATMENT OF FACIAL PALSY

The recommendation of Ballance and Duel, based on experimental and clinical grounds, that every case of facial palsy should be submitted to operation as soon as possible has yielded a large harvest of good results. But as many cases recover spontaneously their advice has not always proved acceptable. Unfortunately the hope of recovery leads not only to delay, but to such long delay that good recovery in any circumstances is improbable. They stated—perhaps too dogmatically—that " the accepted time to operate is now. No delay is justifiable." In fact, however, it has never been possible to distinguish those cases which will recover without operation from those which will not, apart from those in which it is known that the nerve has been either cut or torn, making recovery impossible without some form of surgical intervention. It was, however, the disastrous result of waiting too long for recovery which never came that led Ballance and Duel into the recommendation that all cases should be submitted to immediate operation.

In the hope of obtaining some information in the matter of prognosis which would resolve this difficulty in the selection of cases for operation, Karsten Kettel[1] (Copenhagen) re-examined a large number of patients suffering from facial palsy from the clinical material treated at the Municipal Hospital in Copenhagen between 1906 and 1938. Among 13,135 cases of suppuration in the middle ear there occurred 264 cases of peripheral facial palsy. None of the patients was under observation for less than a year, and 35 were observed for over twenty years. Many had died and some could not be traced, but it was possible to re-examine 169. Some of the conclusions at which it was justifiable to arrive were as follows: After three years, normal sense of taste on the affected side becomes restored even after a radical mastoid operation. This is ascribed to the possibility that the opposite chorda tympani or the glossopharyngeal on the same side can take over the function of taste, as regeneration of the chorda tympani must be impossible. The proportion of patients with facial palsy is about 2% of all cases of otitis media, both acute and chronic, and this agrees closely with many other statistical observations; but facial palsy is a much commoner complication of chronic than of acute otitis media, this being due chiefly to the distinctive influence of cholesteatoma. Post-operative facial paralysis is also much commoner after chronic than after acute otitis media. This follows from the nature of the operations required, the radical operation and labyrinth operations carrying greater risks. In acute osteitis of the mastoid it is impossible to predict a more favourable result in partial than in complete paralysis, but in the great majority of cases the palsy disappears after operation, without any decompression of the nerve by opening the Fallopian canal. However, if the palsy does not disappear the patient must be kept under observation. Not only is chronic otitis media an absolute indication for the radical operation in facial palsy, in contrast to the relative indication only in acute otitis, but the prognosis is not nearly so good. In about half of these cases there was either no recovery at all, or very little. The test for faradic excitability does not provide any useful information in forming a prognosis. It is noted that a partial paralysis which followed fracture of the posterior wall of the external auditory meatus still persisted 24 years later. In sixty patients in whom facial palsy supervened immediately on either the radical operation or the radical combined with the labyrinthine operation, the recovery was either quite negligible or unsatisfactory in 37; in 6 the paralysis was slight; and in only 17 was there full recovery.

[1] *Arch. Otolaryngol.*, 1943, **37**, 303.

The author concludes that these last bad results might be improved if the advice of Ballance and Duel to reopen the wound immediately were followed, with the object either of decompressing the nerve in its canal or of grafting the gap in a severed nerve. It is possible that some unnecessary operations would be performed, but on the whole the results would be better. Actually, it is quite evident that if the nerve is known to have been divided or torn and the central end is accessible, the sooner the wound is reopened and a graft inserted the more likely is there to be good recovery without contracture. When there is no breach of continuity the benefit of simply exposing the nerve trunk is not so clear, but recovery from haematoma in the canal or swelling caused by bruising is no doubt accelerated. The results of grafting the gap in a torn or severed nerve have been on the whole satisfactory, though the results are not always entirely satisfactory on account of contractures, synkinesia (the whole of the facial musculature contracting together), and occasionally tics. Accessibility of the central end is a necessary assumption which Ballance and Duel ignored, but this condition is not infrequently absent, in which case resort to the older method of uniting the facial with the hypoglossal is necessary. This does not restore the emotional movements to the face, but it apparently possesses the advantage that it is not followed by either contracture or tic.

BILL OF HEALTH FOR TWO GREAT CITIES

Liverpool and Manchester, the third and fourth cities of England in population, and separated from one another by only 35 miles of Lancashire country, show very similar health records. Liverpool has the advantage in the birth rate (20.5 per 1,000 as against Manchester's 17.0), but the death rate is almost identical for 1942 (14.0 and 14.7). In infant mortality Manchester had the better record last year (64.5 per 1,000 births as compared with Liverpool's 76.0), but the maternal mortality rates (round about 2.3) were almost exactly the same in the two cities. Both showed a fall in mortality from tuberculosis; in Manchester this came down to 1.12 per 1,000 of population and in Liverpool to 1.15, but the notifications in Liverpool were slightly up on the previous year, and in Manchester slightly down. Other figures in the reports for 1942 from the medical officers of health show the extent of inoculation against diphtheria. In Manchester to the end of last year 17,707 children under 5 had had a full course of injections, 29,575 children between 5 and 10, and 38,483 between 10 and 15. The figures for these three age groups in Liverpool were respectively 15,337, 28,824, and 35,758, but Liverpool has an estimated total population some 68,000 higher than Manchester, and presumably a higher child population also. In both cities the story of venereal disease is much the same as in London. The medical officer of health for Liverpool mentions that early syphilis appears to have increased four times in the male and eight times in the female population since 1938, and in Manchester, comparing 1942 with 1939, there has been a decrease in new cases of venereal disease among males of 13%, but an increase among females of 28.7%. But, of course, these sex ratios are fallacious, because the figures relate only to civilians, and the true extent of any real increase is not reflected in clinic records. Both these reports indicate the activity and vigilance of the public health departments, especially in maternity and child welfare, sanitary administration, and hospital service. The medical officer of health for Manchester says that the hospital services are ripe for co-ordination, reconstruction, and fresh building. The large and important hospitals controlled by the city council

are providing excellent service, but much devotion is required of the medical and nursing staffs to cope with the disadvantages and difficulties of the many unsatisfactory buildings inherited as the result of transfer of hospital functions. Finally, it should be noted that in neither city in the fourth year of war was there a case of plague, of smallpox, or of typhus fever, and the number of notifications of enteric could almost be counted on the fingers.

OESTROGENS AND VAGINAL GLYCOGEN

As a result of numerous experiments, in which Papanicolaou and his colleagues [1 2 3] played a leading part, examination of the vaginal smears of laboratory animals, and later of women, has been widely used to indicate the approximate amount of oestrogen in circulation and to control oestrogen therapy, though its practical value has been questioned by some. Besides showing a change in cell type, the vaginal epithelium reacts to oestrogens by increasing its glycogen content, the amount of glycogen being directly proportional to the oestrogen stimulus. Thus in the newly born child the vaginal cells contain some glycogen owing to the influence of maternal oestrogen during intra-uterine life. After birth the glycogen quickly disappears, to reappear at pre-pubertal age. During the years of sexual activity the vagina is rich in glycogen, especially during pregnancy. After the menopause the deposit of glycogen wanes, though it persists for a variable period in different women, according to the rate at which the secretion of oestrogen falls off.

Evidence suggests that the vaginal glycogen content is a more accurate indicator of oestrogen stimulation than is the type of epithelial cell, and so vaginal glycogen studies rather than vaginal smears have recently been used in the diagnosis of oestrogen deficiency. Several methods are described—removal of small portions of vaginal epithelium with a punch and staining sections with iodine; addition of a standard amount of Lugol's iodine to the previously collected vaginal discharge; and application of Lugol's iodine direct to the vaginal walls. In all cases the intensity of the brown coloration produced is used as a guide to the amount of oestrogen in circulation. Mack[4] now reports another technique; this consists in making a vaginal smear and then suspending it over a dish of Lugol's iodine. The staining from the iodine vapour is proportional to the glycogen content of the epithelial cells; four grades of reaction are described. Mack has employed this method not only to indicate oestrogen insufficiency but also to compare the results of the various oestrogens in therapy, and to assess the dose required to yield the full glycogen response. His results confirm that glycogen often persists in the vaginal epithelium many years after the menopause. Whether the oestrogen responsible for this continues to come from the ovary, or from other sources such as the adrenals, is unknown; but Mack suggests that the ovary is probably the source, for the glycogen disappears more quickly and constantly after a surgical than after a natural menopause. But this test for oestrogen sufficiency or deficiency suffers the same disadvantage as all indirect methods of oestrogen assay. It depends on the hormone in circulation being in a biologically active form, and also on the ability of the tissue reagent to react to the hormone stimulus; and the tissues are not always able to do this. Thus in the presence of local infection, such as trichomonal vaginitis, Mack found that the glycogen content of the epithelium was unaffected by oestrogen administration. Similarly, in debilitated patients suffering from tuberculosis or other general diseases vaginal glycopenia, like amenorrhoea, is common and persists in spite of oestrogen therapy. This is particularly true in febrile conditions. It has usually been suggested that such conditions have this effect on the genital organs because they suppress the secretion of oestrogen. But Mack's results go to show that toxic factors, and especially fever, do not necessarily inhibit ovarian activity, but act rather as "antihormones" and render the oestrogen biologically inactive or, maybe, even destroy it. Constitutional disease might also prevent the mobilization of glycogen by oestrogen.

Such conjectures raise interesting possibilities. In the meantime this simple and rapid iodine vapour test, with its acknowledged limitations, and demanding a certain amount of experience to interpret the reactions, should be of value to those who undertake oestrogen therapy.

[1] *Amer. J. Anat.*, 1917, **22**, 225.
[2] Ibid., 1933, **52**, 519.
[3] *Proc. Soc. exp. Biol.*, N.Y., 1935, **32**, 585; *Amer. J. Obstet. Gynec.*, 1936, **31**, 806.
[4] *Amer. J. Obstet. Gynec.*, 1943, **45**, 402.

TOXOPLASMA IN MAN

Human toxoplasmosis was first identified in America in a case of infantile encephalomyelitis by A. Wolf, D. Cowen, and B. H. Paige,[1] when the protozoon was transmitted to laboratory animals. It has since been recognized as the cause of a milder encephalitis in older children,[2] and of pulmonary disease in adults.[3] Because of the diagnostic importance of chorioretinitis in this disease a full and illustrated account of the ophthalmoscopic range of variation in the lesions found in nine cases has been recorded by F. L. P. Koch *et al.*[4] The histological basis of these clinical findings is also provided from material obtained at necropsy in four of the cases. Ophthalmoscopically the lesions are focal, bilateral, and often multiple. The macular region is almost invariably involved, but more peripheral lesions are often present, while the remaining portions of the retina and the "vasculature" are normal. The vitreous in all but one case was found to remain clear. The toxoplasmic infection, which takes place during foetal life in the infantile cases, first excites focal oedema, inflammation, and necrosis in the retina and adjacent choroid. This is succeeded by a granulomatous reaction with disorganization of normal structure. The protozoon was identified in these lesions but was rarely found in the choroid. Neutralization tests in rabbits with selected human sera suggest that toxoplasmosis may be more widespread, at all events in North America, than is generally supposed. Thus Sabin[5] has found that in children with a combination of hydrocephalus or microcephaly, cerebral calcification, and chorioretinitis involving the macular region, a positive reaction was obtained in 10 out of 13 cases and in 8 out of 10 of their mothers. But if cerebral calcification and chorioretinitis were lacking the antibodies were absent. A high proportion of positive tests was also obtained in both older children and adults with chorioretinitis of unknown aetiology but resembling that of toxoplasmosis.

We have yet to learn how this disease is acquired by human beings, and by what means it may be treated. So far, however, it has been found[6] that sulphathiazole will hold the infection in check in the mouse if the drug is given within five days of inoculation and then maintained. Since the protozoon is of intracellular habit this observation raises an interesting question concerning the mode of action of this drug in such circumstances.

[1] *Amer. J. Path.*, 1939, **15**, 657; *J. exp. Med.*, 1940, **71**, 187.
[2] Sabin, A. B., *J. Amer. med. Ass.*, 1941, **116**, 801.
[3] Pinkerton, H., and Henderson, R. G., ibid., p. 807.
[4] *Arch. Ophthal.*, Chicago, 1943, **29**, 1.
[5] *Proc. Soc. exp. Biol.*, N.Y., 1942, **51**, 5.
[6] Ibid., p. 19.

POSSIBLE DEVELOPMENTS IN SOCIAL MEDICINE*

BY

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The war, by increasing the interdependence of each member of the community, has stimulated the development of new social concepts and experiments. The widespread interest of the medical profession in social medicine is symptomatic of this new impulse, and has already been made into a potent force by the inauguration of departments of social medicine in the universities of Oxford and Birmingham.

It has been customary in the past to accept as a working hypothesis the belief that most diseases have a single and specific cause. This belief was fostered by the discovery of bacteria and the demonstration of their specific relation to certain diseases, and was fortified by the subsequent discovery of the specific immunity which often follows infection.

Social medicine extends the conception of aetiology beyond the immediate or specific cause to non-specific and often multiple causes—a point elaborated by Prof. Ryle in the Gilchrist lecture (1942). This conception may be applied to diseases which have a well-defined specific cause—for example, tuberculosis and typhoid—as well as to those with a more indefinite aetiology. It is true that the tubercle bacillus causes tuberculosis and the typhoid bacillus causes typhoid, but it is equally true, and of more practical use in preventing these diseases, to say that overcrowding and undernutrition cause tuberculosis, and that impure water supplies and contaminated foodstuffs cause typhoid.

In addition to these external environmental causes there are individual factors depending indirectly on the external environment. Not all of those who are bacteriologically susceptible to an infective disease will develop it. Other links which must be introduced into the aetiological chain are the subject's state of nutrition, the presence of excessive fatigue, and possibly other influences as yet unknown.

Pavlov (1910) described "equilibration with surrounding Nature" as the "fundamental law of life." It is the disturbance of this equilibrium between man and his environment which produces most physical and mental illness. In congenital and inherited disease the equilibrium is disturbed by agencies within the individual, independent of environmental influences. In most other diseases environmental defects play an important and often decisive part in overthrowing this balance which is health.

Claude Bernard referred to the blood and tissue fluids which bring nutrients to the various organs and remove the waste products as the *milieu intérieur*. The patient's external environment, which consists chiefly of his dwelling, his diet, the conditions of his work, the nature of his leisure, and his relations with his family and fellow men, might be called his *milieu extérieur*. It is the relation of disease to the *milieu extérieur* with which social medicine is concerned.

It would be wrong to assume that the advent of social medicine marks a revolution in medical thought or any break in the continuity of medical progress. What is implied by the new name is, I think, a shift of emphasis. Some doctors have always believed that much disease results from bad environmental conditions. Now many more doctors, perhaps the majority, have come to that conclusion.

Sir Wilson Jameson (1942) has shown how advances in social medicine are stimulated in wartime. The development of mass radiography, the expansion of the industrial health services and rehabilitation schemes, and the introduction of a food policy based on health needs have been accelerated by the stimulus of the urgent needs of war. But the facts on which these advances are based and which compel attention to the social aspects of disease were already established before the outbreak of war. Numerous authors had demonstrated the evil effects on health of an inadequate diet, overcrowding, and unhealthy conditions of work.

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One of the most important publications in this country establishing the need for a social approach to the problem of disease is the report of the Registrar-General on Occupational Mortality (1938). This is the first occasion on which mortality rates have been given for different social classes as well as for different occupations, and also the first time that the mortality rates of wives grouped according to the occupation of the husband are given.

The report divides the population into five social classes on the basis of occupation as given in the 1931 census returns. The professions are placed in Class I, skilled workers in Class III, and unskilled workers in Class V, with two intermediate groups. The following facts from the report are among the most significant from the point of view of social medicine. The mortality rates of diseases of the respiratory system, ear and mastoid disease, valvular heart disease, and gastric and duodenal ulcer, and the infant mortality rate increase steadily as the social scale is descended, so that the rates are approximately twice as high in Class V as in Class I. In pregnancy and childbirth the death rate is 50% higher in Class V than in Class I, and in the second year of life the death rate in Class V is five times that of Class I.

The social distribution of some of the commoner forms of cancer is often overlooked, although this report demonstrates a definite relation between social grade and cancer of the "exposed" sites. Death rates from cancer of the tongue, tonsil, jaw, pharynx, oesophagus, stomach, larynx, skin, and uterus are approximately twice as high in Class V as in Class I. Possibly those in the higher occupational groups seek treatment earlier, but this factor can, however, have little effect on the mortality rates of cancer of the stomach, which is almost invariably fatal however early treatment is sought, and in cancer of the stomach there is a steep social gradient in the mortality rates.

The Registrar-General's report testifies to the existence of a mass of preventable disease of social origin. It raises many problems which would appear to be accessible to research in social medicine. It shows, for instance, that there are influences in the environment of the lower occupational groups which produce high mortality rates for all the principal respiratory diseases. What are these adverse factors and how can they be prevented? We know that overcrowding is an important factor in the production of tuberculosis, but we do not yet know for certain why steel workers suffer a high incidence of pneumonia (Registrar-General, 1938), nor what part dust and exposure play in the production of chronic bronchitis and emphysema. It has been shown by Midgley Turner (1938) that cancer of the lung is significantly more common in foundry workers and metal workers than in the general population, and Argyll Campbell (1943) has proved that dusts encountered in the heavy metal industries produce a significant increase in the incidence of pulmonary tumours in mice. But the specific agent or agents responsible for the high rates of cancer of the lung or larynx in these industries have still to be established, and methods of prevention devised. The high death rate from valvular disease of the heart in the lower occupational groups is mainly due to the late results of rheumatic fever. Morris and Titmuss (1942) analysed the relation between rheumatic fever and environment, and concluded that rheumatic heart disease was due to some condition associated with poverty, not necessarily overcrowding. Miller (1942) gives evidence supporting the hypothesis that damp houses are the cause of juvenile rheumatism, while Glazebrook and Scott Thomson (1942) found that a supplement of vitamin C prevented the occurrence of cases of acute rheumatism in a group of 335 boys, whereas in a control group of 1,100 there were 16 cases. The problem of the aetiology of acute rheumatism still awaits a complete solution, although it is now certain that environmental factors are of major importance. The infant mortality rate has long been recognized as an index of social conditions. Malnutrition, overcrowding, and infected food are important causes of high infantile mortality rates, but it is not accurately known how these causes operate and to what extent other factors are involved. These are a few of the problems that confront social medicine; the list could be extended indefinitely.

Social medicine appears to me to open two new doors in medical practice. The first leads to a new attitude to disease, and the second to a new technique for its conquest. I think that one of the first questions a medical student should be trained to ask himself when confronted with a sick person is, "To what extent has this patient's environment contributed to the aetiology of his disease?" and when the diagnosis has been made, "To what extent will the treatment and prognosis in this case be influenced by environmental conditions when he leaves the hospital?" Because it is a new way of looking at disease it should not become a special branch, but should be welded into the clinical curriculum at all points. Above all, it should not be excluded from the stimulating and vitalizing influence of bedside medicine.

The new technique which social medicine offers is one for an extended study of aetiology. If the maximal results are to be obtained a definite method is desirable. Such a study might consist of the following five stages:

1. An inspection of the vital statistics relating to the aetiological problem under consideration. A possible cause of a high disease rate may be suggested by statistical evidence, but this can only be proved or disproved by a close study of individual cases.

2. The "trace-back" stage, consisting of a detailed study of individual cases of the disease in question with special reference to a detailed environmental history checked by personal observation of the patient's *milieu extérieur*.

3. A survey of an adequate sample of the population exposed to the environmental conditions under suspicion, together with a control group not so exposed. A number of latent or early cases of the disease might be discovered in the exposed group at this stage.

4. An attempt to reproduce the condition in experimental animals.

5. The last stage, in which the hypothesis would be proved or disproved, would consist of modifying the environment of an exposed group of the population by removing or neutralizing the suspected adverse characteristics and noting the effect on the incidence of the disease in question.

The individual worker would find it difficult, if not impossible, to complete such an investigation alone. The collaboration of hospital and domiciliary doctors, research workers, statisticians, nutrition workers, sanitary inspectors, social workers, inspectors of factories, works managers, public health doctors, and local authorities might all be required to carry through to a successful conclusion an experiment of this sort. The human element and the diversity of types and conditions encountered might at times baulk and confuse the inquirer, who would find that there were more variables than he could at first control, but I do not believe the difficulties are insuperable. Moreover, the integration of the medical services, to which we can now look forward with confidence, will facilitate the search for the sources of disease by bringing together in one organization workers in curative and preventive medicine.

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BLIND PHYSIOTHERAPISTS

The school of massage for blind men and women, established by the National Institute for the Blind in 1915, is to be enlarged. It will remain in the same building as the Eichholz Clinic in Great Portland Street, London, where another of the extensive floors is to be added to the school premises. During its career the school has undergone sundry changes, but all have been in the cause of progress. As the only training centre in the world exclusively for sightless physiotherapists, the Institute has regarded it a point of honour to maintain a high degree of efficiency, a policy that has established the blind masseur as second to none in the profession. One reason for enlarging the school is the proved success of the "educated" blind and the increase in this category brought about by the growing number of young people passing through the National Institute's two public schools, Worcester College for blind boys, and Chorleywood College for girls with little or no sight. Worcester was much enlarged shortly before the outbreak of war, but already it is filled to capacity; Chorleywood also is nearing the point where more accommodation will be needed for myopic girls eligible for secondary education. Beyond these sources of potential students for the massage school, account must be taken of blinded war casualties in the fighting Services and civilian population, among whom are bound to be many persons desirous of, and suitable for, training. A matter to which full attention must be given is the demand of the profession itself. The blind practitioner cannot lag behind the advancing technique, and the curriculum at the school must be adjusted accordingly. The present two-year course puts severe pressure on the students, and a longer course will probably have to be introduced soon. It is to meet the challenge of modern developments and to help more young blind persons of ability that the National Institute has decided to embark on the extension scheme.

THE TREATMENT OF WAR WOUNDS WITH PENICILLIN

The following is an account written for us by Prof. L. P. Garrod of a report published by the War Office entitled, "A Preliminary Report to the War Office and the Medical Research Council on Investigations concerning the Use of Penicillin in War Wounds—Carried out under the Direction of Prof. H. W. Florey, F.R.S., and Brig. Hugh Cairns, F.R.C.S., R.A.M.C." This report is for official use only, but we are permitted to publish an abstract of its contents.

This printed report of 114 pages is in two parts: a general account of the investigation and its results by Florey and Cairns, and 12 detailed descriptions of particular classes of case by individual surgeons, including numerous fairly full case histories. The work described was carried out in North Africa during a period of only 3 months last summer, in order to ascertain as quickly as possible how penicillin can be used to the best advantage in treating battle wounds. The best use of very limited supplies involved discovering how to obtain good results by local treatment only, since this is far more economical than systemic administration. No attempt was made deliberately to compare penicillin treatment with any other—a much more formidable project.

Methods of Administration

Penicillin was applied locally either as a solution in distilled water containing 250 units of calcium penicillin per c.cm., as a powder in which calcium penicillin was diluted with sulphanilamide to give a strength of 500, 2,000, or 5,000 units per g. (in a few cases it was used undiluted), or as a cream in a lanette wax base. Systemic treatment was achieved by intramuscular or intravenous injection of sodium penicillin by continuous drip in glucose saline, the daily dose being usually 120,000 units: owing to impurities in some of the batches used injection by the former route caused pain and by the latter febrile reactions and early venous thrombosis. There were no serious toxic effects. A good plan was to give intramuscular injections for 1 day after operation, then start on intravenous drip, and revert to intramuscular injections later if necessary. Some loss of potency occurred, especially in calcium penicillin, owing to climatic conditions and transport: doses stated are therefore maxima and the probable true dose was up to 30% less.

Chronic Wound Sepsis

The first phase of the investigation was the treatment in Algiers by Lieut.-Col. Ian Fraser of a series of septic wounds from 3 weeks to 4 months old. These cases were accommodated in a special 30-bed ward, and full bacteriological control was carried out by Major Scott Thomson. Local treatment with solution, powder, and cream was disappointing: accessible surfaces could be sterilized, but deep-seated infection could not be controlled. Systemic administration was resorted to in 8 cases of septic compound fracture, 4 of which received over 1,000,000 units; this lavish treatment cleared up the infection in 6.

It was concluded from this experience that long-standing sepsis with loculated abscesses and poor general condition was a relatively unpromising field, and that cases should be treated earlier. Almost ideal arrangements for this were possible when the campaign in Sicily opened. Lieut.-Col. Fraser and

Major MacLennan (bacteriologist) proceeded to Sicily, where they examined casualties early and gave preliminary treatment: the men were then evacuated to Tripoli or Sousse, where 10 surgeons in 5 general hospitals who took part in the investigation worked in collaboration with Florey and Cairns. The cases treated were of 2 principal classes.

Recent Soft-tissue Wounds

Of these there were 171, of which 53 were treated by Lieut.-Col. J. S. Jeffrey: they were mostly from 3 to 12 days old (extremes 12 hours and 22 days), and the majority were infected, ". . . in fact some were purulent and most were clinically dirty. No case was rejected for this reason, and the wounds were closed before the results of the preliminary bacteriological examination were known." Large and difficult wounds were chosen, including 25 of the buttock: 7 cases were amputation stumps. The policy adopted was immediate closure, relying on penicillin applied locally to hold infection in check. The principal method of application was through tubes inserted at the operation for suture. One or more 1/8-in. rubber tubes were introduced through stab holes or through the wound itself, the outer ends projecting beyond the dressing, and through these from 3 to 10 c.cm. of penicillin solution (250 units per c.cm.) was injected twice daily for 4 days. Some cases were also treated by insufflation of powder, either as a preliminary measure in the forward area (which according to Scott Thomson's bacteriological data reduced the frequency of infection with pyogenic cocci on arrival at the forward base from 57 to 26%) or at the base for 3 days before closure was undertaken: powder alone with no irrigation after closure was used in exceptionally clean cases. Complete union was secured in 104 cases, subtotal union—i.e., healing by granulation in some part of the wound—in 60; failures numbered 7. These wounds show little reaction: they may remain dry or discharge "a thin salmon-pink purulent fluid" which turns green on the dressing—this is "Gram-negative pus" containing *Ps. pyocyanea*, and healing proceeds rapidly in spite of its formation. The results as a whole were such that Jeffrey goes so far as to say: "With penicillin the obstacle of infection has been practically overcome," and it is estimated that from 3 to 6 weeks in hospital is saved. Causes of failure or subtotal union were: stitching up so tightly in layers that the solution could not penetrate the whole of the wound; placing sutures too near the skin edge; removing sutures too soon; injecting too much solution (3 c.cm. per tube was found better than 10 c.cm.), since this tended to separate the wound surfaces; and relying alone on powder before suture when this tends to be washed away by blood. The main difficulty in applying this treatment was caused by unduly drastic wound excision in the forward area: it is very strongly emphasized that this should be conservative, skin especially being spared. It is also stated emphatically that suture should not be attempted in the C.C.S., and that at the forward base where it is undertaken the man should remain until healing is complete.

Recent Fractures

A different method was adopted for compound fractures. There were 36 of these cases, mostly severe comminuted fractures of long bones: they were 5 to 14 days old on arrival at the forward base; 9 had been treated locally with penicillin–sulphanilamide powder and 27 with sulphanilamide only. The aim was to convert to a simple fracture by closure and so prevent chronic infection, and systemic treatment was considered necessary: the standard course was 100,000 units daily (by the 3-hourly intramuscular or continuous intravenous route) for 5 days. Only 31 of the wounds were capable of being sutured: complete union was achieved in 16, subtotal in 10, and there were 5 failures. Of the 6 cases not sutured, 5 healed by granulation rapidly without infection and 1 died of fat embolism. Fractures of the femur gave the worst results, and it is advocated that in future systemic treatment for these should be continued for 7 to 10 days. Inadequate dosage was apparently the main cause of failure, and bacteriological studies showed that pyogenic cocci sometimes persisted after the full course. Closure was too ambitious in some of the large wounds, where drainage even for Gram-negative pus would have been preferable. There were also 2 examples of infection by penicillin-resistant cocci.

Miscellaneous Infections

Smaller numbers of cases were treated in the following categories:

Gas Gangrene.—It was not often possible to get these cases to the forward base before they were moribund, but 7 cases were treated, of which complete histories are given. It is pointed out that the treatment should include full doses of antitoxin to combat the toxaemia, and the excision of all dead tissue, since penicillin cannot reach this. Systemic administration for 3 to 5 days is advocated: local application is useless in treatment, although it may be of great value for prevention. The infection was apparently checked in 4 cases: 3 died from causes apparently outside the control of penicillin.

Head Wounds.—Brain wounds 3 to 12 days old, almost all infected with pyogenic organisms, were excised, cleaned, and closed: a small tube was passed through a stab hole into the brain cavity, and pus was aspirated and solution injected twice daily for 3 to 6 days. Of 23 cases only 3 died—2 of intracranial infection. These results, so far as they go, compare very favourably with those obtained by other methods. Most non-penetrating wounds of the skull and scalp were treated by a single application of powder at the time of suture.

Undiluted Powder and Primary Suture.—During the first 2 days of the Sicilian invasion 13 casualties with wounds involving bones or joints in nearly all cases and averaging 40 hours old were operated on in a hospital ship off-shore. About 1 g. (50,000 units) of undiluted calcium penicillin powder was applied by spoon and rubbed into all parts of the wound, which was then closed. Results, so far as they are known, were excellent, but after-histories are not all available.

Some cases of *burns* were treated by insufflation with "1% penicillin in sulphonamide powder": haemolytic streptococcal infection was thus eliminated which had resisted other treatments. One recent and 9 sulphonamide-resistant cases of *gonorrhoea* were given not more than 12 4-hourly intramuscular injections of 15,000 units, the effect of which was "like turning off a tap": no relapse was observed during 2 to 4 weeks' subsequent observation. (Sulphonamide-resistant gonorrhoea is common in N. Africa, possibly because French M.O.s in charge of brothels give small doses of sulphonamides to prostitutes as a prophylactic. The penicillin treatment of gonorrhoea should be restricted at present to highly trained fighting troops, such as parachutists, in forward areas.)

Future Policy

Evidence has been obtained that "penicillin can make a substantial contribution to the health of wounded soldiers, with corresponding saving of hospital time." Plans for its use should assume that an average of 750,000 units of sodium penicillin per case is required for systemic treatment and of 50,000 units of calcium salt for local. For the time being supplies should be under the control of the Directorate of Pathology at the War Office, and its use "should be mainly concentrated in one theatre of operations." Surgical and pathological penicillin officers should be in charge of treatment, which should be confined to predetermined types of case. The most hopeful field is the early treatment of soft-tissue wounds and fractures. Further experience should lead to improvements in technique, and only when the best methods have been defined should a comparison be made with forms of treatment not employing penicillin. The appointment of a statistical officer is recommended, to supervise accurate record-keeping and a careful follow-up and to assess results. Similar information from an Army group not using penicillin would be valuable: there is an extreme dearth of accurate information about the frequency and duration of sepsis in battle wounds and the effects of other measures such as sulphonamide treatment. Among other types of case, gas gangrene requires further study, and penetrating wounds of the chest, which have hitherto been excluded, should be studied particularly with a view to discovering whether pyogenic coccal infection can be controlled by the more economical method of local application.

"There can be little doubt that the prevention of infection with pyogenic cocci or its control in war wounds is within reach, and no criticism with its emphasis on difficulties should be allowed to stand in the way of the attainment of this ideal."

Reports of Societies

EPIDEMIC HEPATITIS: RECENT FIELD INVESTIGATIONS

At a meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine on Nov. 26, Dr. J. A. BRINCKER presiding, the subject for discussion was epidemic hepatitis. The CHAIRMAN reminded the meeting that jaundice had shown a steep and rapid rise during the last two years in this country, Europe, and North Africa. The Medical Research Council had appointed a committee on the subject, but its conclusions were not yet available. The present discussion would be confined to field work.

Dr. A. A. LISNEY, Deputy Medical Officer of Health for Leicestershire, said that during the past eight years he had collected 1,017 case records of patients in his county who had developed epidemic hepatitis. The first epidemic to come under his notice was in 1936 (there was an earlier one, recorded in the literature, with 45 cases, in 1933). Another epidemic occurred in 1937–8, a third (without so high a peak) in 1938–9, a fourth in 1941–2, and a fifth in 1942–3. In the last of these the total number of cases in one month reached the high level of 132. Only an isolated case appeared in the interval between the early part of 1939 and 1941. During the last epidemic a number of cases also occurred in the city of Leicester (which was not included in his survey), and there were three deaths—two children and one adult—between Oct. 28 and Nov. 14, 1942.

It had been easy to trace the case-to-case spread of the disease. There were a number of mild, abortive, or atypical cases which did not seem to come to anything. The majority of the cases occurred in children; the age group with the highest incidence was 5–10. The disease did not seem to attack the same village twice over, except for a case or two. There were two distinct types of local outbreak in the villages. For example, in Barlestone 49 cases were grouped in a period of less than four months, and at Burbage 84 within six months, but at Shepshed 30 cases were spread out over eleven months, and the same at Sileby and other places. There was no evidence of the disease being spread by means of milk, water, food, or vermin. It was evidently case-to-case spread, probably by droplet infection. The period of infectivity before jaundice appeared was at least a week, and once the jaundice appeared the infectivity ceased. Coryza was a very common symptom, and, except in the first epidemic, when it did not appear, was found in 39% of the cases. Sore throat was a common factor in three of the epidemics. Rash, mostly urticarial, but in a few cases petechial, was seen. There were three deaths, and there was circumstantial evidence of death in two other cases, but these persons had gone outside the county and could not be followed up. An endeavour had been made, by the collection of nasal washings, faecal material, etc., to isolate the organism, but without success. Complications were very rare. In the cases under review Dr. Lisney could record two cases in which diabetes followed almost immediately an attack of infective hepatitis and three others in which intermittent glycosuria had persisted since. Chronic pancreatitis was noted in one of the fatal cases during an exploratory laparotomy.

Infective Hepatitis in North Africa

Dr. E. T. C. SPOONER, Director of the Emergency Medical (Laboratory) Service at Cambridge, brought forward some collected results from different observers of the occurrence of epidemic hepatitis in the Middle East in 1942. It was stated that during the El Alamein battle the hospital sick admissions were about 50% higher than the battle casualty admissions, and a large proportion of this sickness was due to infective hepatitis. The events of the two previous years and the record of the last war made it possible to predict the occurrence of the 1942 epidemic, although no one could have foreseen that its magnitude would have been so great. The case rate per 1,000 during December for British and Dominion troops reached the high figure of 9. The brunt of the Middle East epidemic was borne by the Eighth Army, which accounted for about one-fourth of the total cases. Officers were about 4.7 times as prone to infection as other ranks. It appeared from studying the dispositions of the troops that a period of residence in the El Alamein line might be the predisposing cause of the epidemic. Those regiments which spent the longest time in that region were the most heavily hit. It was difficult to explain on the basis of case-to-case spread and the usually accepted incubation period of about one month how the epidemic in an isolated unit could rise to a maximum and fade out again within five or six weeks, as it sometimes did.

The Indian troops and the Maoris, although both occasionally developed jaundice, were much less frequently affected than Europeans. No insect vectors could be incriminated, and there were no grounds for suspecting any, except that flies were particularly abundant in El Alamein in October and November. Two observations seemed to cast some doubt on the hypothesis of droplet infection. One was that among the crews of vehicles, who had to live, travel, feed, and sleep together, there did not seem to be any special tendency for more than one case to arise in any one vehicle. In a field regiment in which there were 59 cases altogether there were eight instances of more than one case occurring in the crew of one vehicle, but in most of these the time interval between the onset of the cases in the same vehicle was a little less or a little more than a week. The other observation was that the disease showed curiously little tendency to spread from prisoners of war captured in November, among whom jaundice was rife, to others who shared the same camps and who had been captured in the previous spring or summer.

Other Experiences

Squad. Ldr. DALMADY said that R.A.F. experience bore out the point that a larger proportion of officers than men was affected. Major CHUTE suggested that this might have something to do with the different feeding habits of the respective ranks. Officers, even during active operations, had their meals in common, whereas the men kept their own individual utensils. Dr. ELI DAVIS mentioned 29 cases which found their way into hospital and were fairly spread over the twelve months from October, 1942, to October of this year. Three of them had been sent in as cases of acute appendicitis. All were in children or young adults. They included three pairs of siblings. One nurse who was treating jaundice cases developed the disease. One boy had acholuric jaundice, for which splenectomy was done, and he recovered, but two of his cousins developed infective hepatitis during the epidemic. Dr. J. C. FORD spoke of an observation of 300 cases in the borough of Wembley in the autumn of last year. The cases spread across the borough at the same rate as measles and chicken-pox. There was a rise in October and a peak in January. At one particular school there were 78 cases of infective hepatitis out of 778 children on the register. Dr. NEWMAN described a small outbreak which had affected a day nursery. The curious point was that it was the attendants who were attacked, and not, to any large extent, the children. The outbreak illustrated the part played by healthy people in spreading the disease. Dr. W. H. BRADLEY mentioned Hallgren's finding (*Journal*, Nov. 27, p. 681) that the infection was water-borne, but Dr. LISNEY said that water supply could be excluded from the Leicestershire cases, and other speakers who had given their experiences agreed that the water could not be incriminated.

ADVANCES IN ORTHOPAEDICS

In his presidential address at the recent annual meeting of the British Orthopaedic Association Mr. G. R. GIRDLESTONE discussed the philosophic and practical considerations which marked the development of orthopaedics and the manner in which it had influenced the treatment of fractures in this country. There were still few general hospitals, he said, with a good accident service, although the case for it had been proved. Some hospitals were quite blind to their shortcomings. Members of the association must be guides and see to it that safe and simple methods were taught, and that, for example, splintage provided freedom from pain, freedom from pins, freedom of the circulation and freedom for its subsequent expansion. Familiarity with the ways of living tissues and the study of the bad end-results of trauma revealed that

the great majority of the latter were due to lack of knowledge, of dexterity, of gentleness, and of sustained interest in the after-care. The strength of the association and of its influence was in the regular meetings of a society of friends, eager to talk "shop" and exchange ideas, to travel widely to see the work of other men at home and abroad, to discuss freely in a spirit of mutual understanding and good will, seeking the truth without fear of offending one another, showing failures and confessing difficulties. Of orthopaedic hospitals he said their mercy must be very practical, but would only be effective if based on skill hardly won and generously given by men and women who had taken pains to acquire an intimate knowledge of their work and were unsparing of time and trouble.

Training, Resettlement, Rehabilitation

Mr. G. GOMME of the Ministry of Labour, reporting on the development of the Ministry's interim scheme for training and resettlement of the disabled, said 100,000 interviews with disabled workmen while in hospital had been completed. Broadly speaking, physical disability was not such a serious barrier to employment as had previously been thought. While 70% of those interviewed were back at work, it was open to question whether many of the wartime jobs arranged were suitable as permanent resettlement. The scheme had not yet been able to cope with that not inconsiderable group who for various reasons (usually psychological) were unemployable.

Mr. W. GISSANE, in describing the Birmingham experiment in accident treatment, referred to "rehabilitation shops" where the injured man could combine necessary treatment with productive work; it was hoped to provide a series to cover Birmingham. Here the hospital surgeon was concerned with planning jobs and progress in movements, power, and duration of work. In the team also were the factory doctor and the shop manager—who was invaluable in making the work suitable for the more important activity of the factory in which the man was expected to earn his livelihood. The final stage was the direct transfer of the workman out of these shops back to the factory proper. The cycle of treatment was then complete. Major FRANK STINCHFIELD, U.S. Army, described the methods employed in that Army for the rehabilitation of the sick or injured soldier. A motion picture, prepared under the direction of Col. R. L. Diveley, showed the work of a special centre established for this purpose in Great Britain.

Some Orthopaedic Procedures

Major R. SOTO-HALL (U.S. Army Medical Corps) discussed lesions of the articular cartilage of the patella, which were found to have a high incidence scarcely noted in the Anglo-American literature. Fractures in the cartilage of the patella without bone involvement were common, and as a delayed manifestation was chondromalacia patellae. This was believed to be a form of aseptic necrosis and appeared as degeneration of the cartilage matrix. Many patients had little disability if the area involved was small. Of the operations—partial resection of abnormal cartilage, total resection of the articular surface, and patellectomy—the first-mentioned was useful only in small lesions, the second was unsatisfactory, but the third gave good results. He had performed it in five cases: four with good or excellent results, the remaining one not improved. In patellectomy care must be taken to restore proper tension in the quadriceps expansion by overlapping the tendon. Major R. PATTERSON (U.S.A.M.C.) emphasized that in fractures of the upper end of the tibia involving the knee-joint excellent results could be obtained by conservative methods: aspiration of the haemarthrosis, reduction by compression or manipulation, and the institution of early motion, the next day passively and at about five days actively, in a Thomas splint with a Pierson attachment and traction. The improved control obtained by the incorporation of the patient's thigh and the upper part of the splint in plaster-of-Paris was also demonstrated.

Wing Comdr. W. D. COLTART, R.A.F., reviewed a series of injuries of the astragalus peculiar to airmen whose plane crashes. He emphasized the importance of complete reduction of the subastragaloid dislocation or subluxation which occurred in so many fractures of the neck of the talus. It was secured by plantar flexion, but might recur when this position was relieved at the end of the first month. Posterior dislocation of the body was a surgical emergency, and should be reduced at once. The body should be preserved, if possible, even when, in late cases, avascular necrosis was present, for arthrodesis would give better results than astragalectomy, preserving the height of the foot and the leverage of the forefoot. If the whole bone or the body were irretrievable a second-stage fusion of the tibia to the os calcis should be planned. While deformity of the body following avascular necrosis rendered fusion inevitable, it had to be remembered that mere radiographic opacity without deformity could resolve if immobilization of the contiguous joints had been begun before opacity appeared and was continued long enough for regeneration to occur (this might take as long as 37 weeks).

Col. St. J. D. BUXTON, discussing gunshot wounds of the elbow-joint, reported upon 51 such injuries recorded by the M.E.F. during the third Libyan battle in the summer of 1942. Suppurative arthritis developed in 31, and amputation was necessary in two cases. There was no fracture in three elbows; there was severe bony damage in at least four out of every five patients, and the olecranon was injured in nearly half of all the elbows. There was evidence of injury to 16 peripheral nerves, of which 9 had recovered in four months or less; the fate of 2 was not known. He described the type of operation advisable in the forward and base areas, and stressed the advisability of leaving large bony fragments which had attachment, but of removing all small loose fragments lying around the fractured bones. The latter was important when an excision of the joint was performed. The indications for aspiration and delayed arthrotomy by posterior drainage were stated. The splinting employed was plaster-of-Paris, extending from the axilla to metacarpal necks, with the forearm supinated and wrist dorsiflexed. Large dirty wounds often improved by dressing through windows in the plaster two to three weeks after the wound, but usually the plaster was not changed for three weeks. Stiffness of the shoulder and hand was prevented by early active movement of these joints. The loss of the olecranon was not necessarily the cause of poor function. Recurrent osteomyelitis and sequestra formation were not a frequent sequel if the primary operation was well planned. Ankylosis was expected in 17 cases and flail elbows in 4.

Prof. H. J. SEDDON described the epidemic of poliomyelitis in Malta, to which reference was made in these columns on Nov. 27 (p. 687).

During the meeting it was announced that negotiations between the R.C.S. and the B.O.A. were well advanced for establishing the official headquarters of the association in premises of the College at Lincoln's Inn Fields. The advantages to British surgeons of the integration of this and other special branches of surgical science within the domain of the parent body were not least of the many desirable features of such an arrangement.

NUTRITIONAL RELIEF AFTER THE WAR

The scientific and medical aspects of nutritional relief after the war were discussed at a meeting of the Nutrition Society held on Nov. 6 at the London School of Hygiene and Tropical Medicine. Lord HORDER, who presided, opened with a brief review of the functions of the United Nations Relief and Rehabilitation Administration. He said there was a gap in the executive power of the Director-General, who, although empowered to collect food and commodities for export to countries needing relief, was not in a position to order the production of the necessary supplies. A Supreme Economic Council was obviously required. Another defect might possibly arise through inadequate planning for the transference of the responsibility for nutritional relief between the initial military government and U.N.R.R.A.

An Estimate of the Task

Prof. J. R. MARRACK said that the deficiency of food in Continental Europe at the end of 1918 was due much more to failure in production than to the lack of imports. The labour of men and animals was taken from the fields, artificial fertilizers were scarce, reduced crops led to destruction of animals and to further impoverishment of the soil through lack of manure. For the whole Continent cereal production was reduced by one-third; the reduction in livestock varied from 14% in France to over 70% in West Poland, and carcass weights were reduced even more on account of the leanness of the animals. In Germany milk production was only one-third of the pre-war level. Most of the relief was obtained on

special credits granted by Governments, particularly that of the U.S.A., and this allowed the importation of some 4,000,000 tons of flour and grain, smaller amounts of pork products, and some miscellaneous and Army foods. The total imports by the official relief systems, which ended in September, 1919, were less than in a corresponding period before the war, and did not make good the deficit in the wheat harvest alone. Less food was supplied to Europe during the whole relief period than was imported into Great Britain in 1918, when our food imports were at their lowest level. Subsequent relief depended upon charity, and mainly took the form of canteen meals supplied to children who showed signs of malnutrition. At peak periods in April, 1920 and 1921, 3¼ and 2¾ million children were being fed. In Austria the meals supplied 660 calories, and contained only 5 g. of animal protein, the vitamins A and D of 60 ml. of fresh milk, and practically no vitamin C. A warning of what might happen if relief measures were inadequate was to be found in the famine in the U.S.S.R. in 1921–2, which caused 3,000,000 deaths through starvation and many more from indirect effects. The war also brought an alarming increase in juvenile tuberculosis in different parts of Europe.

It was estimated that the average normal consumer on the Continent was now receiving 1,400 calories a day, which meant a deficit of 600 calories. The deficiency varied from a consumption of under 1,000 calories in Greece, Poland, and Spain to a consumption of almost completely adequate amounts in Germany. Slaughter of at least 10,000,000 cattle had led to a deficiency of meat, milk, cheese, and butter. The worst sufferers must be children over 5, because most of the milk was reserved for infants. The effects of the deficiency in first-class protein were found in an increased incidence of tuberculosis. Vitamin deficiencies were not universal: rickets was even less common in Belgium than formerly, due to the distribution of vitamin D, while the addition of vitamin A to margarine had reduced the risk of acute deficiency of this vitamin. Scurvy was held in check by the widespread consumption of potatoes, which also had a high yield of calories per acre. The use of flour of a high degree of extraction made deficiency of vitamin B unlikely except in areas where maize was used.

Surgeon-General EVANG pointed out that the power to allow or deny foodstuffs to occupied countries according to their value in the war effort was a most valuable weapon in Germany's hands, and it was questionable how far Prof. Marrack's estimates of caloric intakes were applicable to the more favoured regions. The criteria of undernutrition were difficult to define; in particular the significance of "hunger oedema" was puzzling, and its supposed relation to protein deficiency was obscured by its occurrence in Norway in persons receiving adequate amounts of good protein in the form of fish. In planning relief first consideration must be given to calories to be supplied as grain and fats. A valuable source of protein could be opened rapidly after the war by supplying fishing equipment to Norwegian seamen.

Dr. GEOFFREY H. BOURNE gave figures for the caloric values of the rations allowed in 1942 in different parts of Europe. Compared with a pre-war level of 3,000 calories the rations in Bohemia and Moravia provided 1,800 calories, in Norway 1,200, Denmark 1,400, Holland 1,800, Belgium 1,000, France 1,000, Serbia 1,200, Croatia 900, Greece 500; in Eastern Poland the Poles received 700 calories and Jews only 400, while in Western Poland the ration was about 1,000 calories. There was severe deprivation in occupied Russia. For the rest of Europe 1,000 to 1,500 calories could be taken as typical, with a tendency for malnutrition to be worse in towns.

How to Secure Relief

Dr. J. HAMMOND, discussing problems of production and relief, said the latter must be carried out in two stages. The first, which would raise nutrition to a level based on minimum requirements for life and health, must be realized in all countries before any one country started on the second phase, which aimed at raising the standard to optimum levels. The first minimum standards would be based on the rations now allowed in this country, but modified according to the pre-war food conditions and habits of the country concerned. Thus the number of calories required would vary from 900 for a child under 1 year to 4,200 for an adult male engaged in heavy work. Milk would be needed at the rate of 300 ml. daily for adolescents of 14 to 21 years old, and of 800 ml. daily for those 6 months to 3 years old and for expectant and nursing mothers. The annual allowance for adults in high-class proteins could be supplied as 30 kg. of meat, 76 kg. of milk, 4 kg. of cheese, 3 kg. of eggs, and 10 kg. of fish. As consumption of animal protein in Southern and Eastern Europe did not reach these levels even before the war, it would not be necessary to provide the full amounts, at least in the first stage.

There were two ways of supplying the relief: (1) by increased production in the country concerned; and (2) by importing food from over-seas to make up the main deficiencies of the locally produced diet. Cereal crops in Europe to-day were probably 10% below their pre-war level, though high milling reduced the deficit so far as human requirements were concerned. Farm animals had probably decreased by about 25% in number. To increase crops in the liberated countries fertilizers and machinery for deep ploughing must be supplied; these would need much less shipping space than the foodstuffs they produced. To get more milk dairy cows and others capable of reproduction should be preserved from slaughter, and their number increased by artificial fertilization with the semen of pedigree bulls. About three times as much land was needed to feed an individual on a diet rich in animal protein as on a mainly vegetarian diet. To satisfy immediate demands for meat adequate stocks should be accumulated now in canned or dehydrated form. The breeding of pigs and poultry should be started later, since some of their food was fit for direct human consumption. So far as British agriculture was concerned, the present high rate of production would have to be continued. Cereal products would be needed for human consumption on the Continent and in the Far East, so that imported concentrated animal feeding stuffs would probably remain in short supply. For the same amount of fodder the yield of milk was much greater than the yield of meat; therefore available supplies should be mainly devoted to milk production. We should be prepared for a prolongation of the period of meat rationing.

The organization of relief in the field was described by Dr. AUDREY RUSSELL, medical director to the Central Council for Refugees. She said it was highly desirable in order to improve morale to combine relief with a resumption so far as possible of public services. In Spain, where in 1938 the available diet contained only about 1,000 calories, the relief organization distributed dried milk, pulses, and fish. Infants were allowed 2 to 3 tins of condensed milk a week. Rickets and famine oedema were common, although plentiful supplies of tomatoes and oranges prevented any danger from scurvy. In Barcelona dried whole milk and cod-liver oil were distributed. In schools dietary treatment was combined with rest and exposure to sunlight, the degree of activity allowed being graded according to the child's fitness. When possible relief should be given to families rather than to colonies of separated individuals, who were often sick persons more suitable for hospital treatment. Care should be exercised in the use of unfamiliar foods. Thus undigested beans caused a severe outbreak of gastro-enteritis. Army foodstuffs were usually more suitable.

Prof. E. NOBEL recalled the feeding of Austria and other prostrated countries in 1919. The provision of meals for children was under the direction of Dr. von Pirquet and extended over three years. A charge of 5d. per child per meal was made, which met the cost of foodstuffs and cooking. The degree of undernourishment was assessed by the ratio of body weight to sitting height, and convenient code words were devised whereby the nutritional state of the children could be expressed. The need for foods familiar to the people was emphasized also by Dr. DAGMAR WILSON, with special reference to the current situation in Bengal, where a rice-eating population had no facilities for cooking the wheat imported to relieve the famine.

Discussing opportunities for nutritional research in the work of relief Miss E. M. M. HUME of the Lister Institute said such opportunities would undoubtedly exist after the present war, but for a much shorter time than after the last, because modern knowledge should permit the rapid cure of acute forms of deficiency. Research workers acting in liaison with relief organizations and with full official backing might gather useful information on the incidence of subclinical deficiencies. Data might be obtained of the minimum amounts of the various nutrients necessary for health; these would give guidance to the relief organization as to the real need for the very high levels that had been recommended in some quarters. Dr. A. P. MEIKLEJOHN predicted that the conditions for nutritional research would be very different from those prevailing after the last war, and suggested the organization of strong reconnaissance groups to examine families at random in regard to dietary history, blood haemoglobin, vitamins C and A in the blood, and vitamin A by the dark-adaptation method.

The opening meeting of the 1943–4 session of the Ulster Medical Society was held on Oct. 21. The outgoing president, Dr. ROBERT MARSHALL, introduced Dr. W. DICKEY to the chair, who then delivered his address, "A Problem of Race." After quoting the statement that Irish nurses are more susceptible to tuberculosis than those of the rest of Great Britain, he traced the various races of Europe from very early days, and then discussed the theories of heredity. He concluded a very interesting address by saying that there is no evidence of any racial susceptibility to disease.

The number of cases and suspected cases of leprosy in Germany was 24 at the end of 1942 (*Reichsgesundheitsblatt*, 1943, **18**, 393). Of these, 12 men and 6 women were under medical treatment; 4 men and 2 women were under medical supervision. There were 14 cases in Prussia, 7 in Hamburg, 2 in Württemberg, and 1 in Ostmark. Two new cases occurred in the year: one of these was formerly a sailor and the other was a Ukrainian. Three lepers died during the year.

Correspondence

Epidemic Infective Hepatitis

SIR,—I read your leader on epidemic infective hepatitis (Nov. 27, p. 680) with great interest, as I have been an impotent observer of this condition for almost six years. Dr. Edwards tells me that he saw a case in this sanatorium as early as 1925 and that cases have been occurring since then. Although the main features agree with observations on other outbreaks there have been minor variations.

1. For over four years the disease was restricted to one of our ward blocks, although ambulant patients from all four blocks shared the same dining-hall and entertainments. On a few occasions infection has passed between inmates of a two-bed cubicle. Since 1942 cases have been appearing on one other block. The crops have rarely exceeded two cases. The disease, therefore, does not appear here in epidemic form, and I suggest that this low infectivity in the open-air conditions of sanatorium life supports the theory that the infection is air-borne.

2. Only one member of the staff has been infected (cf. Evans, 1942).

3. As the period of infectivity has not been determined the incubation period is doubtful in cases of continued contact. But as our cases have cropped up fairly regularly at approximately monthly intervals with occasional gaps of two months it has been assumed that they were due to serial case-to-case infection with an incubation period of approximately one month, and that missed cases bridged the gaps as suggested by Newman (1942).

4. In about half of a series of cases the erythrocyte sedimentation rate was markedly slowed when the jaundice was at its worst. At the following monthly estimation the rate had returned to approximately the pre-jaundice level. Any change for the better or worse could be attributed to the tuberculous process (cf. Evans, 1942).

5. There has not been a death in my own series, but a death from acute yellow atrophy in 1933 may have followed infective hepatitis. Only one case in my time has caused serious concern. Pleural effusion developed in the pneumothorax of two cases, but this was probably chance.

6. In the average case the onset has been sudden with slight fever, malaise, headache, and possibly vomiting. Conjunctival icterus appeared within 48 hours.

7. No case of jaundice has been reported among the sanatorium pigs.

I feel that a useful field for epidemiological research has been rather wasted on us because the liver happens to be situated below the diaphragm.—I am, etc.,

Cheshire Joint Sanatorium, Market Drayton. A. CLARK PENMAN.

Diagnosis of Endogenous (Spontaneous) Hypoglycaemia

SIR,—The diagnosis of spontaneous hypoglycaemia seems to be becoming too popular, and an increasing number of cases are referred to me to decide whether a pancreatic operation or merely diet regulation is necessary. Most have had suggestive symptoms of weakness, dizziness, or even minor "black-outs" some hours after meals, apparently relieved by carbohydrate food, and most patients bring me glucose-tolerance tests after glucose supposed to prove hypoglycaemia. The majority of these curves have been completely normal, and there seems to be a widespread misconception of the range of normal blood sugar (b.s.) on which a few facts may be useful. The fasting b.s. normally ranges between 70 and 100 mg. per 100 c.cm. blood. Most lie between 80 and 95 mg., but figures between 70 and 80 mg. are not uncommon, and unless the level is *below 70 mg. per 100 c.cm.*, either fasting or after glucose, pathological hypoglycaemia is disproved. Indeed, symptoms are not likely to be produced unless the b.s. is 60 mg. per 100 c.cm. or below. Another misconception is to look upon a flat curve that hardly rises from the base line (e.g., 80, 95, 85, 75, 78 mg. half-hourly after glucose) as indicating hypoglycaemia, though this is not infrequent in healthy students, and merely shows a high "C tolerance" and a well-balanced b.s. regulation. It should be unnecessary to point out that such diagnostic investigations must be carried out with great accuracy and in duplicate; but I get a lot of curious curves which won't repeat.

The ordinary glucose tolerance carried out for 2 or 2½ hours is not a conclusive procedure. The real proof of hyperinsulinism from pancreatic tumours is the progressive fall of the b.s. on *fasting*. But a b.s. curve carried on for 4 to 6 hours after glucose is, in my experience, a useful test to show the type of spontaneous hypoglycaemia in which the b.s. swings down below 70 mg. per 100 c.cm. blood, sometimes accompanied by symptoms, for a brief period and then recovers spontaneously—e.g., 85 (fasting), 120 (1/2 hour), 110 (1 hour), 70 (1½ hours), 60 (2 hours), 70 (3 hours), 85 (4 hours), 85 mg. per 100 c.cm. (5 hours). Such patients require no treatment other than a small carbohydrate meal halfway between the main meals of the day.

I think true endogenous hypoglycaemia of any type is very rare, and overdone at present as an explanation for minor indispositions.—I am, etc.,

London, W.1. R. D. LAWRENCE.

Industrial Lead Poisoning

SIR,—Industrial health is receiving increasing attention in the medical press. This is a step those of us interested in this branch of medicine very much appreciate. It is important, however, that articles on industrial subjects should be accurate and should not mislead newcomers to this field. These comments are prompted by a recent leading article on industrial plumbism in the *Journal* of Oct. 23 (p. 515). In the first paragraph there are misstatements of figures of case incidence. The peak incidence of lead poisoning cases in 1924 was due to the high incidence both in ship-breaking (131) and in electric accumulator manufacture (101), while the number of cases in 1934 was certainly not due, as stated, to the manufacture of electric accumulators, since in this year the number of cases in this industry had fallen to 12.

This may be passed over as a matter of detail. A much more important fault, however, is that the article fails to differentiate clearly between the diagnosis of lead poisoning and the control of an industrial lead hazard. The former depends upon the clinical picture, aided, perhaps, by certain scientific findings; the latter can be achieved only by scientific aids and by a proper appraisement of clinical findings where these exist. The appearance of symptoms and the production of a clinical picture are evidence of the failure of control. The article quotes recent American work, and accepts uncritically conclusions concerning the place of punctate basophil counts in the control of a lead hazard. These conclusions are based on a very small number of cases. The work, moreover, contains an obvious fallacy. That such an article should receive this added publicity is unfortunate, since your article may throw into disrepute a measure for the control of an industrial lead hazard which has been proved reliable beyond any shadow of doubt.

The great improvement brought about in the largest section of the electric accumulator industry over the last 15 years has been made possible by the use of the following scientific aids: (1) lead-in-air determinations; (2) punctate basophil counts, together with haemoglobin estimations; (3) lead-in-urine determinations. Probably the most useful of these, from a practical point of view, has been the blood examination, not to show the particularly susceptible individual (though this is useful) but to indicate varying degrees of exposure among *groups* of workers. It would be a great pity if the proper use of this method for the control of a lead hazard were questioned on such evidence as is used in the leading article in question.

A final mistake might also be pointed out. The article states that the blue line indicates severe exposure. This is not so. The presence of a blue line depends as much upon the individual exposed as upon the severity of the exposure. The *frequency* of blue lines in a *group* is helpful evidence in estimating and controlling a lead hazard, just as punctate basophil counts or lead-in-urine determinations; but the finding

of a blue line in an individual case has but little significance in itself beyond indicating that lead is being absorbed, and it certainly gives but little idea of the degree of severity of exposure to which the individual has been subjected.—I am, etc.,

Manchester. RONALD E. LANE.

Malignant Tertian Malaria

SIR,—May I be allowed to register a plea for what I will call the "twentieth case"?

Those of us to whom English mails are a fortnightly, rather than a daily, occurrence tend to read our *Journal* with an assiduity perhaps not always accorded it at home, and on many subjects which do not directly concern us—such as Beveridge plans—we find the contrariness of opinion most stimulating. It inevitably happens, however, that your printed matter touches at times on tropical diseases, which do concern us more nearly. This has been increasingly so of late, since war conditions have enabled a comparatively large number of men—doctors among them—to spend a short while on the West Coast of Africa and acquire that little knowledge which is so dangerous a thing.

It is becoming increasingly apparent, therefore, that cases of malaria in England are being treated by the general practitioner and in general hospitals. Nineteen times out of twenty the patient will recover dramatically, whatever the treatment, and some such cases get reported in your pages. But there is the twentieth case—the one which not so very long ago was principally responsible for the term "the white man's grave"—and this case treated in inexperienced hands is going to prove fatal with a monotonous regularity. It is further unfortunate that not even the most experienced can tell at the onset whether the case seen is going to prove one of those twentieth cases.

My plea, therefore, is that every single case of malaria—and owing to our geographical proximity the majority are infections contracted on the West Coast—should be treated by doctors with considerable tropical experience, preferably in the existing tropical hospitals, but if expense forbids I am sure the Colonial Office, if approached, would be only too pleased to lend the services of some medical officer, preferably from the Colony where the disease originated, who may be home on leave in the area.—I am, etc.,

Accra, Gold Coast. J. S. MINETT.

Therapeutic Fallacies

SIR,—While in agreement with most of the well-balanced statements by J. W. Linnell and W. A. R. Thomson (Nov. 6, p. 572) I hope that the following critical remarks may be found helpful.

It may be true that there is no evidence that nervous strain can produce hypertension, but there is much clinical evidence that such strain tends to hasten the fatal outcome in an established case. Fatalities due to sudden nervous strain do occur even in the large group of undiagnosed and symptomless hypertension. I would therefore hesitate to take the responsibility of keeping all patients in ignorance of their condition, as the authors recommend.

There is no scientific evidence that hypotension conveys anything like "almost certain immunity" to hypertension. Like others I have seen several cases to the contrary.

The prognosis of paroxysmal tachycardia rests on the underlying condition and not on the location of the ectopic pace-maker. While it is true that ventricular paroxysmal tachycardia is more often seen than supraventricular with coronary heart disease, simple ventricular tachycardia in otherwise healthy subjects is no more dangerous than other forms of ectopic tachycardias. The bogy of ventricular fibrillation in these cases is a textbook one only. It is true that digitalis only exceptionally stops attacks of tachycardia, but I remember vividly a child of 8 almost unconscious with a tachycardia of 308 per minute, in whom a single dose of digitalis intravenously proved life-saving. The action in such cases is by atrio-ventricular block. Full doses of digitalis prove most effective in preventing attacks of auricular fibrillation in certain cases where these attacks are probably due to otherwise latent heart failure. I cannot agree to the unqualified recommendation of quinidine at frequent intervals in congestive heart failure due to attacks of paroxysmal tachycardia. This drug has a dangerous depressing action on the myocardium, and should only rarely (and then in expert hands) be given before cardiac failure has been checked by digitalis.

Though the use of arsenic in pernicious anaemia is now obsolete, it is incorrect to deny its action in megalocytic anaemia, which has been proved in countless cases before the advent of liver—e.g., in the form of single massive doses.

The authors state the ineffectiveness of the usual expectorants. But do they really believe that steam inhalations, which they recommend, are more than a placebo, as these never reach further than the fauces? There are, however, more active expectorant principles, such as rad. primulae and others, though they are less popular. The indiscriminate prescription of digitalis in pneumonia is rightly condemned, but the argument "a poison in an already poisoned heart" is too simple to be true. What about digitalis in the failing heart of toxic goitre?

Finally, a word of warning against the regular use of enemata in chronic constipation. This is widely practised on the Continent, and the effects are hardly less harmful than those of regularly taken aperients. The conditioned defaecation reflex is almost irreparably blunted, and the psychological effects are equally bad. Contrary to the authors' optimistic advice of "constantly decreasing daily enemata," the amounts of fluid used have to be increased as time goes on. Chronic constipation is a most difficult condition to cure, and careful adjustment of the habits of life and individualized though elementary psychotherapy are the essentials of treatment. Prohibition of advertisements for liver-salts and similar laxatives would be a useful prophylactic measure.—I am, etc.,

Stratford-on-Avon. MAX WINTERNITZ, M.D.Prague.

Sulphathiazole in Impetigo

SIR,—Dr. H. MacCormac's reference to this treatment (Nov. 27, p. 667) is timely, and bears out my own experience in dealing with impetigo in the war factories under my medical charge. During the past two and a half years the infection has at times assumed almost epidemic form. Routine treatment with ammoniated mercury and zinc paste, copper and zinc lotion, and ferri perchlor. fortis, all gave fair results, but failed to prevent absence from work in many cases. Sterilized sulphanilamide powder was then tried with some success, but toxic side eruptions were not uncommon. Four months ago I started using 5% sulphathiazole in 15% zinc and starch paste, as recommended in the M.R.C. War Memorandum, No. 10. The results have surpassed those obtained by any other form of treatment, impetigo clearing up in a few days without lost working time. The use of the paste has been extended to furunculosis and acne, both of which are common in these war-diet days, and with equally gratifying results. I have not seen a single case of intolerance to sulphathiazole even after it has been rubbed into the skin of acne patients nightly for many weeks; indeed its use in this way eliminates all pimples and blackheads and tones up the skin in a remarkable manner. Strangely enough its continued use on the chin and naso-labial area seems to inhibit the growth of staphylococci also in other areas of the face and neck remote from the site of the inunction.—I am, etc.,

N. HOWARD MUMMERY,
Aircraft Factory M.O.

Scabies and Impetigo

SIR,—Dermatologists are indeed fortunate, for not only do they enjoy undisturbed nights but their specialty does not seem to involve any tedious considerations of the social background of disease.

I have previously pointed out that scabies is a disease with a social threshold. Those people who sleep in single beds and remove their vests when they put on their pyjamas seldom if ever get it. The social threshold is less obvious with impetigo, but it undoubtedly exists. One reason, of course, is careless tolerance of unsightly blemishes; but another is communal use of towels and washing apparatus. A professional household would provide a bath and face towel for everyone, which, allowing for laundry, means at least four towels per head. Actually a household of ten would not consider sixty

at all excessive. A working-class family of ten might have a dozen towels; I have known as few as four.

When, therefore, we encounter a disease so infectious that its very name means "a rushing on," the first thing to do is to order separate towels. This may sound faddy to some people, but if, instead of thinking in terms of ointments and tablets, we apply our surgical knowledge of infection, the necessity is obvious.—I am, etc.,

Norwich. FREWEN MOOR.

Stilboestrol in Breast Cancer

SIR,—The account given by Dr. R. Tudor Edwards (Nov. 20, p. 659) of his case of breast cancer treated by stilboestrol is interesting, as the observations on his patient were so carefully carried out. They should encourage those who are interested in the treatment of cancer. Control of this disease cannot come through the use of the knife, by radium, or, I fear, by x-ray therapy. Some substance must be looked for which will cause the destruction of the carcinomatous cell throughout the body, in the primary growth, the infected glands, and the floating cells which are already in the blood stream or have settled in the internal organs.

A word of caution, however, seems needed. No year date is given for the case, so presumably the whole phenomenon took place from January to October of this year. This can hardly be accounted as cure, and a much longer period must elapse before such a claim can be made. No such claim is made by the author, but careless readers might possibly assume it. There are so many instances in the literature which have been "cured" for long periods. It is significant, however, that all such cases have either recurred or been lost sight of (which most commonly happens), or the patients have died of intercurrent disease at no distant date. I am unaware of any cure which has been permanent. Many have received no treatment at all, others have been treated in many and various ways by medical practitioners, and naturally to the treatment they were undergoing the cure is attributed. In some cases quacks have treated genuine cases handed over to them by surgeons, and the "cure" has lasted for upwards of 22 years. These facts are mentioned not to detract from the excellent result referred to, but to urge Dr. Tudor Edwards to keep in touch with his patient and to publish the result, say, at 5-yearly intervals.

I have treated many cases of breast cancer with stilboestrol during recent years, but have not been fortunate enough to meet with any such encouraging result.—I am, etc.,

London, W.1. DUNCAN C. L. FITZWILLIAMS.

Light Ether Anaesthesia

SIR,—Dr. R. Blair Gould (Nov. 13, p. 607) gives a timely warning against anaesthetists trying to do too much with nitrous oxide anaesthesia, but he does not quite give the answer to the question as to what technique should replace this unsafe proceeding.

After using the Oxford vaporizer on a series of 500 cases I am beginning to appreciate the real value of this machine for producing the lighter planes of ether anaesthesia. There is such a very gradual increase in the strength of ether vapour given by this apparatus that one can give an anaesthetic of no more toxicity than nitrous oxide–oxygen, keeping a bright pink patient unconscious with the lid reflex only just abolished. I use a mixture of trilene 20%, ether 80%. If a quick induction is desired this can be carried through with ethyl chloride until consciousness is lost and then on to trilene–ether with the indicator of the vaporizer at "10" or less. (The limitation of the amount of ethyl chloride is important.)

This technique is excellent for old, ill patients—as, for example, the emergency suprapubic drainage—and in such cases I find the patients talk to us before they leave the theatre. Recently I had a case of extra-uterine pregnancy in a woman with profound heart failure. The operation was difficult and took time, but so light an anaesthesia was maintained that she was actually moving her head before the bandages were fixed, and appeared little worse than before operation.

I am satisfied that light ether anaesthesia is far less harmful than attempts to perform an abdominal operation with nitrous oxide–oxygen only, but it must be really light ether. No other machine I have ever used will give this anaesthesia except the Oxford vaporizer, because no other machine gives such a very gradual increase in ether vapour, which is essential for control of the patient and for avoiding coughing and straining.

If the patient is too lightly under, as may be shown by movements of limbs, by merely moving the indicator slowly up one can deepen the anaesthetic without the resistance which would result from pouring more ether on to an open mask were such light planes of anaesthesia attempted with the open ether technique. For the general practitioner the vaporizer appears to me to be the apparatus of choice for anaesthetizing the bad-risk patient. I cannot help noticing with regret how few newly qualified men and women have ever seen the vaporizer. For the full-time professional anaesthetist there is a wide choice of techniques for the bad-risk operation, but for the occasional anaesthetist ether is, and is likely to remain, the safest anaesthetic. I have certainly not noticed any more tendency to chest complications after properly administered ether than after local anaesthesia.—I am, etc.,

New Barnet. JOHN ELAM.

Adjuvants to Nitrous Oxide Anaesthesia

SIR,—I have read with great interest Dr. R. Blair Gould's article on nitrous oxide anaesthesia (Nov. 13, p. 607). I am in complete agreement with him on the supreme necessity for avoiding anoxia in this or any other type of anaesthesia. I also agree that where nitrous oxide–oxygen is used alone it is usually difficult to avoid anoxia, except in the case of short operations not requiring relaxation. I think, however, that it is feasible to avoid this consequence of nitrous oxide–oxygen anaesthesia by supplementation with other agents. For that purpose the commonest adjuvants are as follows:

1. Ether, trichlorethylene, chloroform. Of these ether has pride of place, particularly in inexperienced hands. In most cases, however, the anaesthesia is purely due to the ether, the nitrous oxide–oxygen simply serving as a vehicle for conveying the ether vapour. The latter is irritant, toxic, explosive, and liable to give rise to unpleasant sequelae. It should therefore, where possible, be avoided. Trichlorethylene is only slightly toxic, non-irritant, and non-explosive, but it does not give adequate relaxation where this is required. In order to avoid tachypnoea and cardiac irregularities a high percentage of oxygen is necessary, so that, again, the anaesthesia is not nitrous oxide–oxygen supplemented by trichlorethylene, but rather is mainly accomplished by the trichlorethylene. Chloroform has all the disadvantages of ether (except irritability and explosibility) in addition to certain grievous effects peculiar to itself, such as its toxic action on the cardiac muscle or the ever-present possibility of sudden death in the early stages of anaesthesia. The indications, therefore, for chloroform as adjuvant to nitrous oxide are practically non-existent.

2. Cyclopropane. This is an exceedingly efficient supplement to nitrous oxide–oxygen, particularly where relaxation is not required. The disadvantages are expense (or the necessity for closed circuit apparatus with carbon dioxide absorption) and explosibility.

3. Spinal anaesthesia. For the longer abdominal operations on comparatively fit subjects a "high spinal," whereby supreme relaxation of the abdominal muscles is combined with quiescent viscera, is ideal, the patient being kept unconscious by means of a light nitrous oxide–oxygen anaesthesia. Nevertheless, if the well-established contraindications to spinal anaesthesia are abused, trouble will result and an otherwise useful technique will fall into disrepute.

4. Continuous pentothal sodium anaesthesia. This forms an excellent supplement to nitrous oxide–oxygen, though again there are definite and well-defined contraindications to be observed, as well as certain cases in which particular care is necessary. The simplest method of administration is a 5% solution contained in a 20-c.cm. syringe strapped to the arm, the needle being retained in the vein throughout and the solution injected as required. Continuous pentothal sodium–nitrous oxide–oxygen forms a pleasant combination from which there is absence or diminution of those after-effects which, while not dangerous, are so trying to the patient in the post-operative period.

5. Local anaesthesia. This is the method *par excellence* in all cases which may be classed as poor surgical risks. For abdominal work, as in the case of a "high spinal," relaxation is obtained by means of injection of the anaesthetic agent while the patient is kept unconscious by nitrous oxide–oxygen anaesthesia given with abundant oxygen. Many techniques are available and are described in the literature on the subject. Contraindications are injections through septic areas or scar tissue; these may be overcome by avoiding local infiltration and hitting off the nerves at a distance, as in intercostal nerve block. The disadvantage is that the injections are time-consuming compared with any of the other means of obtaining anaesthesia; but this, one feels, is a matter of small importance, at any rate when dealing with the very sick, feeble, or aged subject.

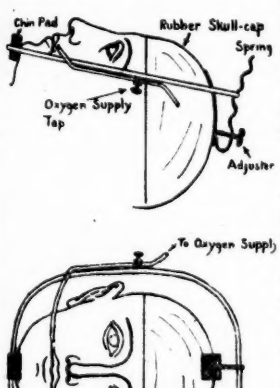
The above, then, are the chief methods of obviating the anoxia inherent in pure nitrous oxide–oxygen anaesthesia. It is only by consideration and evaluation, one against the other, of the four factors present at any operation—i.e., the condition of the patient, the experience and capabilities of the anaesthetist, the type of operation, and the likes and dislikes of the surgeon—that one can assess and judge which of these methods is best in a particular case.—I am, etc.,

London, N.W.3. HELEN BOWER ALCOCK.

Anaesthetist's Third Hand

SIR,—The appearance of a description of an "anaesthetist's third hand" has for me a semi-historical interest. I had occasion to design a similar device some years ago. The idea occurred to me during a discussion with some aeronautical experts on the possibilities of development in aviation afforded by the new plastic processes, and in particular that of bonding rubber to metal. A rubber-to-metal bond was incorporated in the device, which was of the following construction.

Support for the chin was provided by an oval concavo-convex rubber pad mounted on an oval stainless steel hoop. The patient wore a rubber skull cap similar to those commonly used during a tonsillectomy. To the vault of this cap was attached a rectangular metal plate. The attachment was by the rubber–metal bond referred to above. The metal plate was placed in an antero-posterior position and slightly curved on the flat, in order to fit fairly closely to the head.



Illustrating the jaw support

Mounted at the posterior end of the plate was a slightly curvey corrugated spring. The composition of the steel used for this spring required careful selection in order to obtain the necessary degree of resilience and flexibility without producing early fatigue in the metal. In use, the chin pad having been adjusted, the direction of pull was obtained by choosing a suitable notch in the corrugations of the spring. The strength of pull was varied by the small adjuster screw at the base of the spring.

Although I designed this instrument while a resident anaesthetist giving some twenty anaesthetics every day, and using an endotracheal tube several times daily, the device was primarily intended for use with an "open method." Consequently, the following refinement was added. To one lateral curve of the steel hoop, a hollow tube was welded. Anteriorly the tube curved over, to approximate the end of the tube to the corner of the mouth. The other end of this tube was connected to an oxygen supply, usually a small cylinder of oxygen clamped under the head of the operating table. A tap in this tube enabled one to turn on oxygen without even looking away from the patient at what might be a critical moment. Not unnaturally, to my confusion and dismay, the device was thereafter referred to as "Jackson's gas ring"!

It is my impression that, apart from other aspects, there are three fundamentals required in every anaesthetic. The first is the establishment of confidence and assurance in the patient. This requires that the anaesthetist should see his patient before—preferably the day before—the "anaesthetic occasion"; the second is the establishment of anaesthesia, usually the only consideration. The third consideration is the establishment of an airway—*which will require no further interference*. Although I am opposed to multiplication of apparatus and complications in anaesthetics, I feel that there is scope for a "third hand" which will provide constant and even support for the jaw; in fact I feel that some device which is artificially steady is needed to maintain the establishment of a good airway. Furthermore I consider that a support for the jaw is an advantage if it avoids the trauma of an endotracheal tube.

I should add that I do not advocate the use of any form of "third-hand" apparatus either of the "Heyworth hook" or "gas-ring" variety except under conditions in which inexpert interference will not be encountered.

—I am, etc.,

Monkseaton. J. NOEL-JACKSON, M.B., B.S.

Congenital Jaundice in a Man aged 77

SIR,—From the short data given in my letter printed on Nov. 27 it appears that the present case is one of congenital idiopathic hyperbilirubinaemia—the bilirubin in the blood being, of course, "blood bilirubin," which is probably the same as what Virchow called haematoidin—differing, however, from the hyperbilirubinaemia of the well-known cases of familial haemolytic (acholuric) jaundice, notably by the absence of excess of urobilin or urobilinogen in the urine. I suggest that the blood bilirubin in this case is in some way "dammed back" in the circulating blood, as if the threshold for its elimination or catabolism were high. The mere excess of blood bilirubin in the blood, of course, does no harm, though it makes the blood plasma too yellow and produces the jaundice and causes a highly positive indirect van den Bergh reaction. Is it possible that this hyperbilirubinaemia in our present case is the sole obvious result of a new gene mutation of germ cells, which has not (yet) manifested itself in the children and grandchildren because it is not a Mendelian dominant like ordinary familial haemolytic (acholuric) jaundice is?—I am, etc.,

London, W.1. F. PARKES WEBER.

Arsenicals in Vincent's Infection

SIR,—As a dental surgeon I am disturbed to see in Major John Davis's letter (Oct. 9, p. 464) mention of "the pain and discomfort attendant upon a large number of local treatments" for Vincent's infection. One cannot help wondering what can have been the nature of this so painful local treatment. All who have given local treatment to a large number of cases know well the immediate relief afforded the patient by the simple application of chromic acid and hydrogen peroxide as described in Squad. Ldr. Jewesbury's article (Sept. 18, p. 360), or, in the worst cases, by careful swabbing of the ulcerated areas with pure carbolic acid. The patients invariably express gratitude, for the disappearance of the pain is quite spectacular. Scaling is only begun when the gingivae are no longer painful. On the other hand, it is not my experience that intravenous N.A.B. alone produces any such beneficial effect.

So dogmatic a statement concerning "pain and discomfort" from local treatment is not only misleading but decidedly harmful, for if taken at its face value might do much to discourage resort to oral hygiene, the value of which has been so abundantly proved.—I am, etc.,

SELWYN HOLMS,
Flight Lieut., R.A.F.V.R.

Misuse of Vasoconstrictors in Coryza

SIR,—Is it not time the general public was given a word of warning on the use of ephedrine preparations and volatile vasoconstrictors in acute rhinitis? In general practice during the last few years, and latterly since joining the R.A.F. Medical Service, I have seen an increasing number of patients suffering from sinusitis, Eustachian and post-nasal catarrh following the common cold; in these cases I frequently get a history of relief being sought by the use of some form of vasoconstrictor. Further, from my own personal experience I believe that on more than one occasion I have caused a lower nasal infection to spread by shrinking up my nasal mucosa before any active immunity to the infection has been achieved.

It seems reasonable to suppose that Nature, by the swelling of the turbinates in the early stages of infection, cuts off the intricate upper nasal passages from the lower; shrinking of the turbinates with vasoconstrictors opens up the sinuses and ethmoidal cells; after this, blowing of the nose forces infected material into the upper air spaces, and so causes sinusitis, ethmoiditis, and even middle-ear troubles. By counteracting the natural method of germ destruction—i.e., inflammation—one

surely prolongs the infective state, and for the sake of a few minutes' comfort and relief from the oppression caused by nasal obstruction one risks serious complications.—I am, etc.,

T. M. DAVIE,
F/O, R.A.F.V.R.

Treatment of Symptomless Pulmonary Tuberculosis

SIR,—Dr. E. Weatherhead's helpful letter (Nov. 13, p. 621) regarding the treatment of symptomless pulmonary tuberculosis in adolescents, as outlined in the report of the work of the Brompton Hospital Research Department, has served to show that there are some points in the report which require a fuller explanation.

The report evidently gives the impression that after a patient has been found to have radiological evidence of pulmonary tuberculosis artificial pneumothorax treatment is "resorted to forthwith." This is far from the actual procedure. In the first place, by keeping the patient under clinical and radiological observation, great care is taken to make sure that the diagnosis is a correct one. After this has been established, further careful observation is carried on over a period of weeks or months before collapse is decided upon. We have found, however, that there is a danger here; sudden unpredictable exacerbation of the disease may take place, in which event collapse therapy becomes a palliative and not a curative treatment.

With regard to shallow artificial pneumothorax as against complete collapse of the lung, it is quite realized that a shallow pneumothorax gives only a partial relaxation or splinting of the lung, but it appears from our experience that this is all that is necessary to enable early lesions to heal. It also has the advantage, again in our experience, that it is less likely to be followed by complications.

The phrase "as yet it is impossible to assess its value" should read, "as yet it is impossible to assess its *full* value."

Although the work of the Research Department has been going on for a period of 14 years, that period is not long enough for us to have followed a sufficient number of these cases to provide the data necessary to give conclusive statistical information about the behaviour of these cases. Our results are admittedly incomplete, but we considered it would be helpful at this time to put forward our suggestions for treatment by a shallow pneumothorax as a "reasonable alternative" to other methods, which, from our observations, have not given satisfactory results.—I am, etc.,

Brompton Hospital, S.W.3. A. MARGARET C. MACPHERSON.

Treatment of Septic Hands and Fingers

SIR,—I read with interest the letter from Mr. Charles Romer (Oct. 30, p. 556). While it is impossible to discuss, without specific figures, the matter of "over-ripe" septic fingers that arrive at hospital, I feel that a few comments from another recent junior house-surgeon would not be amiss.

(1) I was one of two working in a casualty department in a London hospital. The total number of patients seen was about 1,200 per week, and I am happy to say that I saw only one "over-ripe" finger. I did, however, see a large number in the stage of invasion, and I am surprised that Mr. Romer sees only 5% at this stage. Could this be due to premature incision? I had no cases of necrosis of the terminal phalanx. (2) A G.P. usually sends a patient to hospital for incision of an infected finger, and so long as this is done efficiently he is quite willing and competent to supervise the after-care of the finger—a service for which he is paid in the case of all N.H.I. patients. If only the house-surgeons would realize this fact they would reduce the numbers of patients attending their out-patient departments, thus saving much of the patients' time and giving themselves more time to deal with the cases that need hospital treatment. Furthermore, the hospital funds would not be wasted by treating cases that an equally competent doctor is already paid to treat. (3) I venture to point out that Mr. Romer is running true to form as a newly qualified junior house-surgeon by inferring that the majority of G.P.s are nincompoops whose clinical judgment is valueless.

Again I wish to emphasize that I am a newly qualified house-surgeon and not a general practitioner.—I am, etc.,

Bourne End, Bucks. A. G. S. BAILEY.

Psychiatry at the Cross-roads

SIR,—I am appalled to read the letter of Dr. J. Stephen Horsley under this heading (Nov. 13, p. 620). He states that medical superintendents appoint as medical officers not colleagues but "yes men." I am now working in my fourth mental hospital (fifth if a neurosis hospital is included) and I have not yet found this glib assertion to hold a particle of truth. I have experienced only kindness, interest, and eagerness to assist in any treatment the medical officers have thought of value in the interest of their patients. I have never seen any need to consider the interests of my chiefs, who I am sure would soon have dispensed with my services had I done so to the detriment of my clinical work. They have expected hard and good work from their assistant medical officers, and when it has resulted in an unexpected improvement they have never grudged a "Well done." I have never seen a keen and efficient medical officer snubbed, and as for rivalry between superintendent and his assistant medical officers I am at a loss to understand this statement.

It may be that Dr. Horsley has been unlucky in the superintendents he has met, or that he is exhibiting a mental mechanism, or that I have been exceptionally lucky. I should have thought, however, that four gave a pretty accurate cross-section of medical superintendents as a class. Anyhow, I am proud to look back on my ex-superintendents as my teachers, co-operative colleagues, and my present friends.—I am, etc.,

Wallingford. R. E. M. COKE HARVEY.

Medico-Legal

CONDITIONS IN DETENTION BARRACKS

Public misgivings about cruelty or unnecessary hardship in military prisons and detention quarters will be allayed, if not wholly set at rest, by the report of the Prime Minister's Committee of Inquiry presided over by Mr. Justice Oliver.[1] The misgivings had their origin in the trial at Maidstone in the earlier part of this year of two non-commissioned officers for the manslaughter of a private under detention, ending in their conviction and sentence to 18 and 12 months' imprisonment. The committee of inquiry (whose medical member was Dr. H. E. A. Boldero, Dean of the Middlesex Hospital, in place of Lord Moran, who was originally appointed and found himself unable to serve) has carried through its work with commendable speed, visiting thirteen military prisons, detention barracks, and naval detention quarters in the course of five weeks, and holding more than two hundred individual interviews with detained men. The committee is satisfied that there is not at present, nor has there been for some time past, any calculated brutality or so-called "Gestapo methods" in these establishments, as has been alleged by sections of the Press, though it is less assured as to conditions prevailing in the early part of the war; and it is quite clear that in matters of staffing and in some details of hygiene and sanitation the conditions at present obtaining ought to be improved.

Inherent Difficulties

The difficulties attaching to what is in effect a prison system for men in the fighting Services—though detention does not carry quite the stigma of imprisonment—must be appreciated. Civil prisons no doubt stand in need of reform, but they have a selected, trained, and disciplined staff of warders. The men corresponding to these in the Army prison service are N.C.O.s who have received little or no training for such work, and are unlikely in many cases to have the patience, skill, tact, and firmness which the work demands. Moreover, most of the men under detention are not of the kind customarily found in civil prisons. The majority are men who, while they do not get into trouble with the authorities in civil life, are unequal to the additional liabilities and submissions which a member of the fighting Forces must undertake. Many of them are difficult people—men with grouses, trouble-makers, and determined on antisocial conduct—but there are others whose transgression is

[1] Report of the Prime Minister's Committee of Inquiry into Detention Barracks, 1943. Cmd. 6484. H.M. Stationery Office. (6d.)

due to family trouble or other pressure and who during a period of detention ought to be educated and encouraged. Among them also are men of another type, conscientious objectors, many of whom are of the highest character and of exceptional intelligence, but their considered, though perhaps polite, refusal to submit to orders may be more infuriating to a certain type of subordinate officer than the insolence or occasional violence of others. It is noteworthy that the only two witnesses with whose demeanour the committee says that it was "very favourably impressed" were conscientious objectors. Both told stories of violence which they had witnessed, and which presumably the committee believed, but the stories related to 1940, and to a state of affairs which, it is hoped, has since passed away.

Medical Care

The medical officers concerned seemed to the committee to be well suited to their work, but some of the quarters are served only by part-time officers, and there was some apprehension as to whether they might be quickly available in emergency, though no instance of non-availability was reported. The committee thinks it desirable that a whole-time medical officer should be appointed to each detention barracks, that he should be changed not too frequently—though it is obvious that this is not the kind of work to which a young man should be consigned year after year—and that he should have an aptitude for this rather specialized and difficult employment. If aptitude for the work means an interest in it we imagine that such men may not be easy to find, for it is difficult to imagine a less engaging environment. The medical officer is the natural target for complaint by the men who plead some disability as the easiest way of being excused the harder parts of their routine and find him not so ready to give credence to them as they had expected. At present the time a man spends sick or in hospital counts as part of his sentence. The committee thinks that the task of medical officer would be easier if it did not. The short accounts of ninety or more of the interviews which the committee had with men who complained of grievances make a melancholy recital, sometimes of malingering, but more often of exaggeration of physical defects and infirmities. Many of the assertions of the men were capable of immediate disproof, and when the medical officer was implicated in the complaint and the facts could be tested the committee in every case, after inquiry, upheld his decision. Some of the men showed ingenuity in describing their ailments, and a familiarity with medical terms. Thus one of them complained of "urethritis," though the committee found there was no substance in the complaint. Another said that he had had "arthritic foot"; it was found that he had had gonococcal arthritis, but there was no evidence of disability remaining. Another said that he had "asked to be psychiatrized and had been refused," but it was ascertained that he had already been sent to a psychiatrist.

Sick Quarters, Sanitation, and Food

On two points the committee makes important recommendations. In every such place there should be a room or rooms which can be used for cases of minor sickness. It is undesirable that such cases should be cared for in the usual sleeping quarters, and the use of a neighbouring hospital is not an ideal solution. Another matter on which men made several complaints, and which the committee endorses, concerns the sanitary condition of the sleeping quarters. The men are locked up in their rooms from late afternoon or very early evening until next morning, and the only sanitary arrangements in the rooms consist of buckets, and sometimes only one, sometimes two, closet seats. These are in many cases in the sleeping rooms themselves, without any flushing arrangements, and sometimes not even screened. This is a real hardship, and the committee calls for steps to be taken to provide water-closets outside the rooms and with their own ventilation. Four detention barracks are named where these conditions need immediate attention.

On the question of food the committee makes no recommendations. The food appeared to be of good quality and well cooked, maintaining the men in good health, as evidenced by their appearance and by the fact that the majority gain in weight while under detention. The overriding consideration, as in all prisons, is that "durance vile" must be made less attractive than the conditions under which the men would otherwise be living, or else the object of the penalty is defeated.

The annual report of the Chief Native Commissioner for Southern Rhodesia for 1942 recommends the provision of landing grounds near native clinics in the Native Reserves, especially in remote areas. This would enable serious cases to be transferred rapidly to main centres for skilled hospital treatment. The doctors, he says, should be provided with air transport. The breaking down of the African's prejudice against the "white man's magic" is shown in demands for medical facilities from even the most primitive tribes. The native population is estimated to have increased by 40,000 during 1942, to 1,298,000.

Obituary

TOM BATES, M.B., B.S., F.R.C.S.

The death of Mr. Tom Bates, senior honorary surgeon to the Worcester Royal Infirmary, occurred on Nov. 21 at his residence, 44, Foregate Street, after a very short illness. He was born in Worcester in 1878, being the elder of the two sons of Mr. Tom Bates of Worcester, and was educated at the Worcester Cathedral King's School. He entered St. Bartholomew's Hospital and obtained the M.R.C.S., L.R.C.P. diplomas in 1904 and the F.R.C.S.Eng. in 1905. He obtained the M.B., B.S.Lond. in 1907. He was house-surgeon to Mr. C. B. Lockwood at Bart's and then joined his father in practice in Worcester. His father was appointed honorary surgeon to the General Infirmary (later Royal) at Worcester in 1879 and held that office until 1909 and the appointment of consulting surgeon until 1916, when he died after coming out of retirement to take on the work of his two sons, who had joined the R.A.M.C. Tom Bates succeeded his father as honorary surgeon at the Worcester Infirmary in 1909 and had held that office ever since. His brother, Mark Bates, F.R.C.S., was honorary surgeon for 14 years and is now honorary consulting surgeon and M.O. Venereal Diseases Department. He also was at Bart's.

Tom Bates not only gave untiring service as a surgeon at the Infirmary but his opinion and surgical skill were very highly valued by the practitioners in Worcester and surrounding districts. He never allowed his private practice to interfere with his regular and punctual attendance at the Infirmary to carry out his duties there. The Infirmary and its welfare were truly the pivot of his life, and he gave unstinting service to the patients and to the general running of the medical and surgical services. He was a very regular attendant at all the important committee meetings and was the Infirmary representative on the Hospitals Contributory Schemes Association and chairman of the Area British Hospitals Association. He was not a great talker at meetings and was somewhat impatient with those who liked to hear their own voices. When he spoke, after listening to others, he summed up the salient points in a few words which were devoid of frills. He was an ardent supporter of proposals to improve the nursing profession and was largely instrumental in pressing the claims at committee meetings. He was responsible for starting prizes at the Infirmary for practical and theoretical work of the nurses. He was the representative of the honorary staff on the Infirmary Committee and did all in his power to present its problems to the meetings with justice and equity. He was a staunch and loyal friend to his colleagues and his patients, and his advice was never sought in vain by any of them. His personal integrity was beyond reproach, and he did a lot of good in a quiet way in helping his less fortunate friends and patients. He was very embarrassed by expressions of gratitude for anything that he had done on behalf of the Infirmary or in other ways. He was most hospitable and always welcomed any new colleagues and invited them to partake of his hospitality, and he was at his best when so entertaining. He was keen on bowls and played a good game of bridge, and was always good company and had a subtle humour. He was a regular attendant at the local meetings of the B.M.A., and had been president of the Worcestershire and Herefordshire Branch. He was a keen advocate of clinical meetings and practically always brought cases of interest before the meeting. He took a great interest in making arrangements for the celebration of the bicentenary anniversary of the foundation of the Worcester Infirmary, which is due to be held shortly. One of the Infirmary wards is dedicated to one of the founders, Bishop Maddox.

The colleague and friend from boyhood who wrote the above memoir adds: The death of Tom Bates has left a very great gap in the life of the city of Worcester and district and in the counsels of the Royal Infirmary. He had spent practically the whole of his life in Worcester and was undoubtedly a true citizen. The sympathy of all who knew him is extended to his widow, daughter, and two sons in their great loss. His younger son is now surgical registrar at Bart's in the E.M.S. Chest Unit. A memorial service held at Worcester Cathedral was attended by a very large number of people on Nov. 25.

The death of Dr. FRED PHILLIPS on Oct. 20 is reported from Boksburg, Transvaal. He was born in Newcastle-upon-Tyne in 1887, and from school he embarked upon a classical course, taking residence at Hatfield Hall, Durham, and ultimately attaining his M.A. degree of that university. Medicine

then attracting him, he graduated M.B., B.S.Dunelm through the Newcastle-upon-Tyne School of Medicine in 1912, subsequently serving as house-surgeon and resident medical officer at the Durham County Hospital. There he developed radiology as a specialty, and in that capacity took over to France one of the first mobile *x*-ray units during the early part of the last war. With the rank of captain R.A.M.C., T.F., he remained in *x*-ray work until the cessation of hostilities. General practice at Lanchester, Co. Durham, during the years 1921–2 failing to please him, he went to live at Parkstone, Dorset, whence he migrated to Buenos Aires and ultimately to South Africa. There an intractable surgical malady overtook him.

MR. WALTER HERMAN KIEP, honorary ophthalmic surgeon to the Bradford Eye and Ear Hospital, died suddenly at his home in Apsley Crescent, Bradford, on Nov. 21, at the age of 58. A native of Glasgow he studied medicine in that city, graduating M.B., Ch.B. (with commendation) in 1908. He served for a time as assistant surgeon to the Ophthalmic Institution of Glasgow and honorary oculist to the Royal Hospital for Sick Children. During the last war he held a commission in the R.A.M.C. as a specialist in ophthalmology at Malta 1915–19. After the war he was for a short time professor of ophthalmology in the Egyptian Government Medical School at Cairo. He went to Bradford twenty years ago, and in addition to his post at the Royal Eye and Ear Hospital served also as honorary consulting ophthalmic surgeon to the Victoria Hospital, Keighley, and the Hartley Hospital, Colne. Mr. Kiep was ophthalmic referee under the Workmen's Compensation Act, and had been president of the North of England Ophthalmological Society. He joined the B.M.A. in 1910.

We regret to announce the death in Edinburgh on Nov. 22 of Major JOHN GILMOUR, formerly president of the International Quarantine Board, Egypt, and for the past 15 months temporary inspector under the Cruelty to Animals Act. Born on Sept. 25, 1884, he was educated at George Watson's College and Edinburgh University, graduating M.B., Ch.B. in 1906, and taking the F.R.C.S.Ed. in 1909 after holding house appointments. He joined the R.A.M.C. in 1910 and served throughout the last war, being gazetted brevet major in 1918 after winning the Military Cross. He retired from the Army in the following year, and in 1929 became president of the International Quarantine Board at Alexandria. Major Gilmour held the Insignia of Grand Officer of the Order of the Nile and of the Order of Ismail; he was also a Commander of the Order of George I of Greece and a Chevalier of the Legion of Honour. He was created C.M.G. in 1934. He published a report on the sanitary conditions in Persia in 1924 and annual reports on the pilgrimage to the Hedjaz to the International Health Office, Paris, from 1928 to 1939. During this war he worked in the Department of Health for Scotland until his temporary appointment under the Home Office.

MR. GORDON WILSON THOMAS, consulting surgeon to the Clayton Hospital, Wakefield, died on Nov. 26. He was born at Llanelly on June 18, 1881, and was educated at the Friends' School, Bootham, York, leaving in 1898 to study medicine, first at Leeds and later at the London Hospital. He graduated M.B., B.S.Lond. in 1905 and took the F.R.C.S.Eng. in 1910 after four years in resident appointments at the General Infirmary at Leeds. Settling in practice at Wakefield he became senior honorary surgeon to the Clayton Hospital. Mr. Thomas was an active member of the Leeds and West Riding Medico-Chirurgical Society and held office as chairman of the Wakefield, Pontefract, and Castleford Division of the B.M.A. in 1930–2. When he retired from work on account of ill-health he made his home at Guildford.

By the death of Dr. LOUIS BEER the medical profession loses a really remarkable personality. Born in Amsterdam he was brought to his father's home in the Hampstead Road at the age of 6, and from that time till his death 73 years later he occupied the same house. In the early 'eighties he entered the Middlesex Hospital Medical School and had as fellow students Essex Wynter and John Bland-Sutton, the three becoming lifelong friends. Beer qualified in 1886 and carried on his work as a general practitioner till the day of his death. His gifts were exceptional. He was a most accomplished linguist and was reputed to be able to converse in seven European languages. His mother was of French extraction, and it was said, by those able to judge, that his mastery of the French language was superb. Owing to this ability he had a very extensive practice among foreign residents in all parts of London. His mind was built in a philosophic and logical mould, and I have rarely come across such an acute clinical observer or a more accurate diagnostician. It was a privilege and a pleasure to listen to his preliminary description of the patient whom one was about to see. The salient features were emphasized and a lucid and brilliant picture of the case was presented with a simplicity and directness of language which were remarkable. His descriptions were so faultless that they might well serve as classical models of what clinical summaries should be. The effect produced on the listener was as if he were being shown a piece of sculpture, so clean and clear was the outline. Nor can I recall a single occasion on which I detected an error either of observation or in the logical deduction drawn from the data. Like the old physicians his diagnosis was based upon his knowledge of morbid anatomy, and curiously enough it was at a post-mortem examination that I first made his acquaintance 42 years ago. Practising in the neighbourhood, he frequently sent patients into the Middlesex Hospital, where, among the members of the hospital staff, he had a crowd of friends and admirers. His whole life was spent among his patients, and to them his passing will be irreparable. To poor and rich alike he was always the same. He found his reward in the quality of his work and in the confidence and devotion he inspired in his patients. He was a member of the British Medical Association and for several years he held an appointment as clinical assistant to the Soho Hospital for Women, gynaecology being a branch of medicine in which he was always interested. He died, as he would have wished to die, in harness. He was making an emergency call when he was stricken and the end came within a few hours. *Quis scit, an adjiciant hodiernae crastina summae tempora di superi?*—C. E. LAKIN.

JOHN NIGEL STARK, consulting surgeon to the Royal Samaritan Hospital for Women, Glasgow, died at his home in Murrayfield Gardens, Edinburgh, where he lived after retiring from active practice in 1928 and travelling abroad. Dr. Nigel Stark received his medical education at the University of Edinburgh, graduating M.B., C.M. in 1884, and proceeded to the M.D. (with commendation) in 1900. He was elected a Fellow of the Royal Faculty of Physicians and Surgeons of Glasgow in 1890, after his appointment as assistant obstetric physician to the Glasgow Royal Maternity and Women's Hospital and assistant surgeon to the Royal Samaritan Hospital. Dr. Nigel Stark was a Fellow of the Edinburgh Obstetrical Society and had been president of the Glasgow Obstetrical and Gynaecological Society. He joined the B.M.A. in 1888. He was the author of *An Obstetric Diary of William Hunter, 1762-1765, with Notes*, published in 1909.

Dr. WILLIAM FOGGITT CHRISPIN of Castleford, Yorks, who has died at the age of 80, practised in that town for 44 years, until his retirement in 1942. He studied medicine at Leeds and took the L.S.A. in 1898, and when the title of the diploma was changed became L.M.S.S.A. in 1907. Dr. Chrispin had had a long career in public service: he was M.O.H. for Castleford for 12 years and later was a member of the urban council for 9 years, and chairman in 1936–7. Since 1930 he had been a justice of the peace and took his place regularly on the Castleford Bench until a few weeks ago; he was also a churchwarden for many years, serving altogether under five rectors. He joined the B.M.A. in 1905 and remained a member until he gave up active work.

Dr. M. J. Fenton writes: In the *Journal* seventeen years ago (1926, **2**, 548) Dr. ERIC PRITCHARD wrote: "Exactly the same feeding [i.e., as given to his first child] had fatal consequences in the case of my second child—through no fault of the laboratories, but solely owing to my own incompetence—and it was that never-to-be-forgotten experience that determined me to devote my life to a study of the means of obviating such disasters in the future." The devotion and the study the late Dr. Eric Pritchard gave to this subject brought untold pleasures to the world at large and to mothers in particular. Another instance of the profession's gifts to mankind through personal experience.

We regret to announce the death of Dr. EDWARD WILLIAM DACRE HARDY, *M.C.*, consulting anaesthetist to the Royal Victoria and West Hants Hospital and to the Hants and Bournemouth Children's Clinics. He was born on July 7, 1878, son of Dr. W. G. Hardy of Bournemouth, and from Haileybury College went up in 1897 to Christ's College, Cambridge, and thence for his clinical course to St. Bartholomew's Hospital. After qualifying M.R.C.S., L.R.C.P. in 1906, he was house-surgeon at the Royal Berks Hospital at Reading, and then returned to Bournemouth to take up general practice, with anaesthesia as a specialty, which occupied more and more of his time. His first appointments at the Royal Victoria and West Hants Hospital were those of anaesthetist, junior assistant physician, and registrar. During the war of 1914–18 he served in the R.A.M.C. with the temporary rank of captain and was

awarded the Military Cross. Dr. Hardy joined the B.M.A. in 1917, was chairman of the Bournemouth Division in 1925–6, and vice-president of the Section of Anaesthetics at the Bournemouth Annual Meeting of 1934, serving also on the Local General Committee. More than a year ago he had to give up practice owing to ill-health. He was a most kindly and charming companion and an all-round sportsman. He enjoyed lawn tennis, swimming, golf, sailing, and fishing, and bred wire-haired fox terriers.

The following appreciation of Mr. JOHN LEVIS comes from Dr. C. E. S. Flemming: The first thought at the news of the death of John Levis must have been one of deep grief at the loss of a great friend, a loss seemingly irreparable not only to ourselves but to the profession, the hospitals he worked for, and the public throughout a large district. Medical men, patients and friends, and the public each and all obviously felt how great had been their loss. Simplicity and absolute sincerity, invariable good temper, native Irish humour and kind words, unselfishness, never failing to help when wanted, and the success of his work—all these inspired great respect and a very real affection. It was not only patients but the medical profession who valued his skill in diagnosis and treatment, for the demand on his services was great and the work he did must have been prodigious. I remember, about four years ago, that after a visit to a meeting of surgeons in Paris and then a hard day's operating in Trowbridge Hospital he was so tired that when driving home he felt ill and could not go on till someone found him in his car and had him driven home. A memorial service in Trowbridge Parish Church, which was filled with old patients and friends and all the medical men of the district, was a striking evidence of the feelings of the public towards what the local newspaper called "a beloved surgeon." His great success as a surgeon must have been largely due to the high esteem in which his work was held by his colleagues, for he spoke little at meetings and wrote hardly at all.

The following appreciation of Dr. W. BURTON WOOD comes from T. H. S.: Those who knew Burton Wood can only regret that contact with this generous and stimulating personality was not more widespread. A philosopher in the widest sense of the term, his conversation left his hearers with a feeling of profound benefit and satisfaction that was derived from a rare blend of wisdom and humour. Wider audiences will recall his lectures and addresses with lively gratitude, and patients will realize how much they owed to the personality and advice of the physician. His approach to chest work was essentially conservative, but as soon as a good case could be fully made out for any radical change in treatment his support and encouragement were unfailing. His illness over the last few years depicted the man he was: an omnivorous reader and thinker, a writer of fascinating letters, an optimistic though no visionary builder for the future. His was truly a spirit for which death could not spell "finis."

An obituary notice of Mr. GEORGE COWEN, M.S., F.R.C.S., appeared in the *Journal* of Nov. 13. Dr. R. Vaughan Thomas writes from Birkenhead: As an old senior house-surgeon at the Royal South Hants Hospital, Southampton, may I be allowed to pay a tribute to his memory. He was much beloved and respected by staff and patients alike. By nature kind and gentle, unassuming and possessing a keen sense of humour, ever ready to lend a helping hand to a timid and hesitant house-surgeon, he helped many along surgical paths. An indefatigable worker, a most thorough and profound clinician, and a dexterous operator, he would have been an asset to any teaching school. His surgical skill and knowledge knew no bounds; he was master of his art in any branch of surgery. His knowledge was founded on a wealth of clinical experience, gathered over many years by his long association with the two hospitals at Southampton. Mr. Cowen represented in every sense the finest type of British provincial surgeon. He was one whom it was an honour and a privilege to serve. He will be long remembered with affection by many who had the good fortune to work with him at Southampton.

We regret to announce the death of Dr. ROBERT LINDSAY, to whose memory a colleague sends the following tribute: One who, by his cultured mind, courage, devotion to duty, and modesty, did much to maintain the respect in which our profession is held died at Southport on Nov. 4 in the person of Dr. Robert Lindsay of Cupola House, Folkestone. He was first in the open bursary list when he entered the University of Glasgow from Kilmarnock Academy in 1908. Before commencing the study of medicine he had taken the M.A. with honours in classics. He had many distinctions in medicine. Graduating M.B., Ch.B. in 1916 he immediately entered the R.A.M.C. and saw service in Mesopotamia and in France, being medical officer with the 1st Battalion of the Grenadier Guards at the signing of the Armistice. He started practice in Radcliffe, Lancashire, in 1920, but in 1935 his health broke down and he had to give up work for eighteen months. On his partial recovery he took up practice in Folkestone, hoping that limited activity in the mild climate of the south would help him to recover his strength. Though he was unfit when war broke out, he refused to leave Folkestone, where he felt his duty lay. For repeated acts of gallantry he was awarded the George Medal in 1940. Six months ago he had an acute exacerbation of his illness and from this he never recovered. Robert Lindsay retained his early love of Latin and Greek and was an accomplished classical scholar. He was the kindest-hearted of men and the warmest of friends, and he was fortunate in finding great happiness in his home. His modesty prevented him from exploiting his brilliant gifts as he could, perhaps should, have done. To his devoted wife, his son, who is a student of medicine, and his daughter we offer sincere sympathy.—D. C.

Many members will learn with regret of the death of Mr. S. COULSON, who was chief clerk of the British Medical Association from 1908 until he retired on account of ill-health in 1937. Mr. Coulson rendered loyal and efficient service to the medical profession as the senior member of the clerical staff of the Secretarial Department for so many years.

Dr. Philip A. Maplestone writes from Lachlan Park Hospital, New Norfolk, Tasmania: I received to-day the issue of the *Journal* dated May 8 in which are some tributes to the late Prof. WARRINGTON YORKE, hence this somewhat belated communication. There is an important aspect of his career and of his character that does not seem to have been appreciated, and one that I think should be placed on record. If one glances through the publications of those numerous workers (including myself) who collaborated with him, I think it will be agreed that in many instances their best work has been done while in association with him. This occurs too often to be a coincidence, and although, with his typical fair-mindedness, he would never admit this to me, I think it is clear to many of us who were fortunate enough to have worked in his company that we, to a large extent, owe such successes as we have later achieved to this association.

Medical Notes in Parliament

Royal Commission on Birth Rate

Mr. ATTLEE announced on Dec. 1 that the Government had decided to set up a Royal Commission to investigate the birth rate and trends of population, and that Lord Simon, the Lord Chancellor, had accepted the chairmanship. Other members of the Commission would be announced as soon as practicable. Their terms of reference would be: "To examine the facts relating to the present population trends in Great Britain; to investigate the causes of these trends and to consider their possible consequences; to consider what measures, if any, should be taken in the national interest to influence the future trend of population; and to make recommendations."

The Government had also decided to set on foot immediately a number of inquiries of a technical kind, the scope and character of which would be determined in consultation with the chairman of the Commission. The results would be made available to the Commission as soon as possible. It was expected that in the meantime the Commission would find it practicable to explore and to take evidence upon more general issues connected with the subject. Inclusion in the Commission of a housing expert would be considered. Mr. Atlee hoped that the Commission would report as quickly as it could.

Forthcoming White Paper

During the debate on the address in reply to the King's speech in the House of Commons on Nov. 30, Sir HENRY MORRIS-JONES said that there was no mandate from the country with regard to a State Medical Service. He doubted whether in time of peace any Government could possibly introduce legislation of such an immense character without securing a mandate beforehand. He was glad that the King's speech referred to proposals which would come before the House for discussion. Whatever shape or form it might take, such a scheme would mean great evolutionary and revolutionary changes in the country affecting everyone. It was only right that before submitting legislation to the House the Government should wish to hear the feelings and desires of the House and the country in regard to such a great reform.

Mr. LYTTELTON, in reply, said he quite understood that the House might be impatient on the subject of the social security scheme. He would have been so himself if he had not been a member of a Ministerial committee which had to deal with that question. The complexity of it had to be seen to be believed. If they took part of it, say workmen's compensation or the comprehensive medical service, they would become involved in administrative problems of the very greatest difficulty, requiring not only an encyclopaedic knowledge of the background, but very great administrative experience in solving present problems. The bulk of the problem had been tackled. The White Paper was now being drafted, and would be laid before Parliament. It would show that the Government had very definite proposals over a large part of the field, but that there were some subjects on which they were undecided and wished to take the opinion of members and to make soundings. He saw nothing reprehensible in that. Did anyone realize that a matter like the comprehensive medical service involved altering the number of those entitled to a comprehensive medical service from 18,000,000, the present insured population, to the whole population of 44,250,000?

Patulin

In an answer to Colonel Evans on Dec. 2 Miss HORSBRUGH referred to recent trials of the use of patulin. She said the Medical Research Council had accepted an invitation to undertake the organization of controlled clinical trials on a considerable scale. Arrangements were in hand for instituting these immediately. For the time being the use of patulin in the treatment of the common cold must be regarded as still in the experimental stage. Preliminary trials had not given consistent results, although some of these had been promising. It was uncertain what value the drug would eventually prove to have. It would necessarily take some months to collect adequate information on this point, and as regards the best methods of administration, the proper dosage, and the conditions under which the drug could be used with safety. It would be inadvisable to take steps to make patulin generally available until there was sufficient evidence on these questions.

Medical News

The Nuffield Provincial Hospitals Trust, at Lord Nuffield's suggestion, has offered the University of Oxford £8,000 a year for ten years towards the cost of establishing and maintaining a plastic surgery unit in the University of Oxford. The University has accepted with gratitude the offer of the Trust and has appointed Mr. T. Pomfret Kilner, F.R.C.S., as the first director of the plastic surgery unit with the title of Nuffield Professor of Plastic Surgery. The Radcliffe Infirmary will provide hospital facilities for the unit, and these will be supplemented by the Ministry of Pensions.

Prof. T. P. McMurray will open a discussion on "The Late Problems of War Surgery" at a clinical meeting to be held at 2.30 p.m. on Dec. 16 in the Ministry of Pensions Hospital, Woolton Road, Liverpool, 16.

Mr. R. Watson-Jones will speak on "A Surgeon's Impressions of Soviet Russia" at the annual general meeting of the Anglo-Soviet Medical Council on Friday, Dec. 17, at 4.30 p.m. at the Royal Society of Medicine.

A meeting of the Fever Hospital Medical Service Group will be held at Tavistock House, Tavistock Square, London, W.C.1, on Friday, Dec. 17, at 3 p.m., preceded by a meeting of the Group Council at 2.30 p.m. Subject for discussion: "Control of Cross-infection"; to be opened by Dr. R. B. Bourdillon, Dr. Joyce Wright, and Dr. H. Stanley Banks.

At the Royal Society of Medicine on Dec. 15, at 2 p.m. for 2.15 p.m., the Section of Comparative Medicine will hold the second of its discussions under the heading of "The Limitations and Uses of the Comparative Method of Medicine." The subject on this occasion will be animal ecology and genetics; openers: ecology, M. A. C. Hinton, F.R.S.; genetics, Dr. H. Grüneberg.

The Agricultural Group of the Society of Chemical Industry will meet on Tuesday, Dec. 14, at 4 p.m. in the rooms of the Chemical Society, Burlington House, Piccadilly, W., when a paper on livestock deficiency diseases and their treatment will be presented by Dr. S. J. Watson, Director of Research, Jealotts Hill Research Station.

The following meetings of the British Institute of Radiology will take place in the Reid-Knox Hall, 32, Welbeck Street, London, W.: Friday, Dec. 17, at 2.30 p.m., meeting of medical members. Saturday, Dec. 18, at 2.30 p.m., ordinary meeting, at which papers will be read on chronic intussusception in children by Dr. F. H. Kemp, and on instantaneous stereography by G. L. Rogers, Ph.D.

At a meeting of the Eugenics Society on Tuesday, Dec. 14, at 5 o'clock, at the rooms of the Royal Society, Burlington House, Piccadilly, W., Dr. J. A. Fraser Roberts will speak on "Population Problems in the Light of Differential Fertility." All interested in the subject are invited to attend.

The Finney-Howell Research Foundation announces that applications for fellowships for next year must be filed in the office of the Foundation, 1211, Cathedral Street, Baltimore, Maryland, by Jan. 1, 1944. Applications received after that date cannot be considered for 1944 awards, which will be made on March 1. This Foundation was provided for in the will of the late Dr. George Walker of Baltimore for the support of "research work into the cause or causes and the treatment of cancer." Fellowships, carrying an annual stipend of $2,000, are awarded for the period of one year, with the possibility of renewal up to three years; special grants of limited sums may be made by the Board of Directors to support the work carried on under a fellowship. Application forms will be furnished by the secretary or any member of the Board.

An American-Soviet Medical Society has been founded in New York to meet an increasing demand for information about the results and achievements of Soviet medicine. The president of the society is Dr. Walter B. Cannon, emeritus professor of physiology at Harvard University; and Dr. Henry E. Sigerist, director of the Institute of the History of Medicine, Johns Hopkins University, is to be editor of its journal, *The American Review of Soviet Medicine*. The temporary offices of the society are at 130, West 46th Street, New York City.

Service medical officers in this country are to be allowed, so far as their military duties permit, to help civilian doctors during the present epidemic. Hard-pressed general practitioners needing help are advised to apply to the secretary of their local Medical War Committee forthwith.

Universities and Colleges

UNIVERSITY OF OXFORD

In a Congregation held on Nov. 20 the following medical degrees were conferred:

B.M., B.CH.—J. Badenoch, *A. H. Torrance.
*In absentia.

UNIVERSITY OF CAMBRIDGE

At a Congregation held on Nov. 19 the following medical degrees where conferred:

M.D.—J. B. Murray, *D. D. Evans, *E. T. D. Fletcher.
M.B., B.CHIR.—*F. M. Deighton.
*By proxy.

The Services

Major (temp. Lieut.-Col.) R. McI. Gordon, D.S.O., D.F.C., R.A.M.C., has been awarded the George Medal in recognition of gallant conduct in carrying out hazardous work in the Middle East in a very brave manner.

Lieut. B. Brownscombe, R.A.M.C., has been awarded the George Medal in recognition of conspicuous gallantry in carrying out hazardous work in a very brave manner.

The following appointments, awards, and mentions have been announced in a *Supplement* to the *London Gazette* in recognition of gallant and distinguished services in the Middle East:

C.B.E. (Military Division).—Brig. (temp.) R. W. Galloway, late R.A.M.C.

O.B.E. (Military Division).—Cols. (temp.) F. R. H. Mollan, M.C., J. G. Morgan; Lieut.-Col. R. MacL. Savege, M.C.; Majors (temp Lieut.-Cols.) C. W. Arnot, M.C., D. W. Jolly, A. N. B. Odbert, P. J. Richards, H. S. Ward, R.A.M.C.

M.B.E. (Military Division).—Capt. (temp. Major) A. J. C. Latchmore, R.A.M.C.; Subedar M. Singh, I.M.D.

M.C.—Capt. D. Rumney, R.A.M.C.

Mentioned in Dispatches.—Capt. E. F. Ridley, R.A.M.C.

CASUALTIES IN THE MEDICAL SERVICES

Wounded.—Temp. Lieut.-Col. M. J. Kohane, M.C., R.A.M.C.; Temp. Acting Surg. Lieut.-Cmdr. S. W. Maxwell, R.N.V.R.

Prisoners of War.—War Subs. Capt. F. E. de W. Cayley, Capt. R. M. J. Franks, War Subs. Major A. C. King, Capt. J. Ledingham, Acting Major T. M. Pemberton, War Subs. Capt. J. Richardson, War Subs. Capt. P. G. Seed, and Temp. Lieut.-Col. J. H. Strahan, R.A.M.C.

Reported Missing.—Surg. Lieut. R. McF. Kirkpatrick, R.N.V.R.

Died on Active Service.—Major W. H. Purves, M.B.E., R.A.M.C.

EPIDEMIOLOGICAL NOTES

Influenza

The returns for the week ending Nov. 27 show another large rise in the deaths from influenza in the 126 great towns—375 as compared with 106 in the week ending Nov. 20 and 46 in the week ending Nov. 13. In the week corresponding to that ending Nov. 27 in the six previous years the number of influenzal deaths varied between 25 and 52. The notifications of acute pneumonia (including primary and influenzal) during the six weeks up to and including week ending Nov. 27 were: 579, 576, 676, 781, 978, 1,647.

Discussion of Table

In *England and Wales* during the week scarlet fever notifications fell by 138, those of diphtheria by 114, and those of whooping-cough by 36. The incidence of measles remained at the same level for the third consecutive week. There were 197 more cases of acute pneumonia, and 18 more of dysentery.

There was less scarlet fever in the North; in the South the situation was unchanged. The rise in pneumonia and the fall in diphtheria were general throughout the country. There was much variation in the local trends of whooping-cough; the largest decreases were in Yorks West Riding by 53 and in Staffordshire by 30; the greatest increases were in Derbyshire by 34 and in Lancashire by 32 cases.

There was no fresh outbreak of dysentery, the increase being due to small rises in existing centres of infection. The largest totals were in London 49, Middlesex 23, Kent 16, Lancashire 13, Yorks West Riding 11. After a week's interval a further 8 cases were reported from Bedfordshire, Biggleswade R.D.

In *Scotland* notifications of scarlet fever were down by 47, of dysentery by 28, of measles by 19; primary pneumonia was up by 39, and whooping-cough by 13. On Nov. 30 Mr. Johnston informed Mr. McNeil that notifications of cases of pulmonary tuberculosis between June 1 and Nov. 1, 1943, were 3,073. The corresponding figures for the same period in 1942 was 2,633; in 1941, 2,361; and in 1940, 2,118.

In *Eire* notifications of diphtheria rose by 18, and those of whooping-cough by 40. Whooping-cough was concentrated in five areas, where 52 of the 61 cases were reported.

Smallpox

A case of smallpox and 2 suspected cases were removed from a ship at a West of Scotland port. A conference of health authorities was held, and all necessary steps to organize precautions were taken. The 3,000 passengers were moved to an isolation centre, to be detained there for fourteen days. The patient, a soldier aged 23, is stated to be improving, and the suspects have been found not to suffer from the disease. No further developments are expected.

Scotland's Health

Dr. Andrew Davidson, Chief Medical Officer of the Department of Health for Scotland, stated at a recent Press conference that the nation's health at the beginning of the fifth winter of hostilities was surprisingly good, but that there was no lack of health problems. The incidences of tuberculosis, of infant mortality, and of venereal diseases have risen since 1939. A recent inquiry among the insured population showed that, although the incidence of sickness had risen sharply, there was a remarkable drop in the average duration of sickness for both males and females. The biggest of the immediate problems was tuberculosis, which had risen by 17% during the war. But for the shortage of nurses and domestic staff, 300 more beds could be put into commission. The waiting list for treatment has doubled during the past year, and about 1,000 pulmonary and 200 non-pulmonary tuberculosis patients were on the list. Dysentery of a mild type had increased since the war. Diphtheria mortality had fallen following the campaign for immunization; but there were still nearly half a million children unprotected, and unless a sense of urgency in prevention could be maintained there was a danger of losing the benefits they had already achieved.

The Week Ending November 27

The returns of the notifications of infectious diseases in England and Wales during the week included: scarlet fever 3,157, whooping-cough 1,800, diphtheria 732, measles 518, acute pneumonia 1,647, cerebrospinal fever 43, dysentery 147, paratyphoid, 2. The deaths from influenza in the 126 great towns numbered 375.

No. 46

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Nov. 20.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease) are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1943 (a)	(b)	(c)	(d)	(e)	1942 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	51	2	26	3	2	68	—	21	3	3
Deaths		1	1				—	4		
Diphtheria	705	40	175	135	27	1,001	49	262	86	29
Deaths	10	1	3	1	2	26	3	3	1	—
Dysentery	176	49	59	—	7	117	18	67	—	—
Deaths				—	—				—	—
Encephalitis lethargica, acute	2	—	—	—	—	2	—	—	—	—
Deaths		—					1			
Erysipelas			50	13	5			69	17	2
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				24					62	
Deaths	39	1	11	13	2	57	10	12	14	4
Measles	556	49	48	43	3	8,816	362	428	38	40
Deaths	—	—	—	—	—	7	1	1	1	1
Ophthalmia neonatorum	74	3	20	1	—	83	4	19	—	1
Deaths										
Paratyphoid fever	4	1	2	—	—	5	2	1	—	
Deaths	—	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal*	978	73	20	6	1	645	36	7	—	12
Deaths (from influenza)	106	10	32	—	3	1	1	1	—	—
Pneumonia, primary			298	21				226	19	
Deaths		48		19	11		40		13	
Polio-encephalitis, acute	—	—				1	—			
Deaths		—					—			
Poliomyelitis, acute	8	1	1	1	—	15	1	1	25	2
Deaths		—					—			
Puerperal fever		1	18	1	—		3	17	2	—
Deaths		1					—			
Puerperal pyrexia†	134	7	13		3	137	4	13		—
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	3,098	258	356	35	90	2,914	166	430	75	66
Deaths	1	—	—	—	—	2	—	—	—	1
Smallpox	—	—	—	—	—	—	—	3	—	—
Deaths				—	—				—	—
Typhoid fever	8	—	2	15	2	6	—	4	11	4
Deaths	—	—	—	—	—		—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	8	—
Deaths				—	—				—	—
Whooping-cough	1,866	151	233	61	20	1,246	92	33	79	25
Deaths	11	2	2	4	—	9	1	—	2	—
Deaths (0–1 year)	323	37	64	51	31	342	42	65	43	14
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	4,934	742	727	228	137	4,439	710	589	231	124
Annual death rate (per 1,000 persons living)			16·4	15·0	‡			13·3	15·4	‡
Live births	5,562	685	809	284	274	5,742	670	705	369	253
Annual rate per 1,000 persons living			16·5	18·7	‡			14·6	24·6	‡
Stillbirths	216	27	20			188	21	27		
Rate per 1,000 total births (including stillborn)			24					37		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes puerperal fever for England and Wales and Eire.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.

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ANY QUESTIONS?

Influenza

Q.—*I would be grateful for any suggestions on the prevailing epidemic of influenza, in which the predominant symptoms are pyrexia, hyperpyrexia, petechial haemorrhages of uvula, palate, and fauces, persistent cough, sometimes with moisture in lungs. Is this true influenza, 1918–19 type? If so, what is the line of treatment?*

A.—In their studies of epidemic influenza in 1936–7, much of which was due to influenza virus A, Stuart-Harris and his colleagues[1] recognized three clinical forms of the infection: simple influenza, influenza with bronchiolitis, and influenzal pneumonia. A typical case of simple influenza began suddenly with headache, followed by shivering, aches in the limbs and back, and a short, dry, persistent cough; temperature rose quickly to 102°–103° F., and by the second day the infection was at its height with severe headache, muscular pains, glistening injected throat, and upper respiratory symptoms. By the fifth day temperature was normal; the patient was rather weak, but was fit for discharge by the ninth or tenth day. In influenza with bronchiolitis, the pulmonary symptoms (rales and rhonchi, particularly at the bases) dominated the picture; the patient was more ill, with some cyanosis, and pyrexia lasted longer, sometimes with a short afebrile interlude. The chest signs either accompanied the initial fever or were associated with a secondary relapse.

In the third group with pneumonia the consolidation might develop with surprising rapidity—the typical influenzal pneumonia which was common in the 1918 pandemic—or it occurred as a post-influenzal complication. The early influenzal pneumonia is characterized by the so-called "heliotrope" cyanosis, abundant frothy (sometimes blood-stained) spit, physical signs of a bronchiolitis or basal pneumonia, and in severe cases a rapid worsening of the patient's condition, with death within 2 to 3 days. It is not yet known whether this pneumonia is due to the virus itself or to a secondary bacterial invader. The post-influenzal pneumonias are mostly caused by bacterial infection; the staphylococcus, haemolytic streptococcus, Pfeiffer's bacillus, and the pneumococcus have all been incriminated, one or other of them usually being predominant in outbreaks in different localities, which suggests a case-to-case spread of these organisms.

The symptoms described in the question would fit either simple influenza or influenza with bronchiolitis, but for absolute proof that an illness of this kind is "epidemic influenza" either influenza virus must be isolated from the patient's throat or the appearance of specific antibody in the patient's blood must be demonstrated. As infection with epidemic influenza virus A is now being found in many parts of the country, the chances are that the condition described is influenza. However, febrile catarrhs (not due to an influenza virus) and atypical pneumonia may give a somewhat similar syndrome. In the latter infection *x*-ray examination usually reveals a characteristic picture and "cold-agglutinins" develop in the patient's blood.

The treatment of influenza is early confinement to bed, preferably at home, with full ventilation of the room, alleviation of the presenting symptoms with appropriate remedies, and a careful convalescence. The sulphonamide drugs have no effect on the primary virus infection, but should be used at the first signs of a secondary bacterial complication.

Chronic Pancreatitis

Q.—*Fourteen months ago a man aged 53 became deeply jaundiced, with some attacks of abdominal pain. Six months after its onset a cholecystgastrostomy was performed, and at this time no apparent neoplasm of the pancreas was found. The diagnosis previously made had been carcinoma of the head of the pancreas. The pancreas was, in fact, diffusely hardened with some nodular formation. Some such nodule apparently had caused occlusion of the bile-duct by direct pressure. No section was taken for biopsy. Nothing abnormal in the liver. Jaundice disappeared, and with it the steatorrhoea and icterus, etc., but after three months the clay-coloured stools returned, and this has since persisted. Three months ago the patient developed sternal pain of gradually increasing severity, accompanied by much vomiting of bile-stained fluid and undigested food. On admission to hospital he was dehydrated and wasted. There was complete duodenal stenosis, and a gastro-jejunostomy was performed. Stomach greatly distended, but again no evidence of neoplasm in the abdomen. The pancreas still presented the same nodular hard thickening, but the cause of the duodenal obstruction was not discovered; it was apparently due to some form of mechanical kinking and/or pressure of the hardened pancreas. This operation was followed by rapid amelioration of symptoms, and the patient made a good recovery. Just before his discharge, weight 6 stone, however, an accidental blood-sugar estimation revealed a figure of 0.392 mg. per 100 c.cm., and he was put on insulin soluble 5 units twice daily. His present weight is 8 st. 7 lb. Is this a true case of chronic pancreatic fibrosis, to what would you attribute his present steatorrhoea, and what treatment, if any, would you suggest? His intense hunger soon after quite a good meal is, I presume, a diabetic symptom accompanied by the effects of rapid gastric emptying following the gastro-jejunostomy.*

A.—The question asks for diagnosis at a distance, which is not a procedure to be encouraged. In any event the differential diagnosis between carcinoma and chronic inflammation of the pancreas may often be almost impossible during life. The sequence of events is clearly related to the effects of pressure by the indurated pancreas (biliary and duodenal obstruction), and to the disturbance of pancreatic function (hyperglycaemia and steatorrhoea). The intense hunger after meals is more likely to be due to faulty absorption of fat and protein than to the hyperglycaemia or rapid gastric emptying. The length of the history suggests that this is a case of chronic fibrosis of the pancreas, but the possibility of a slowly infiltrating neoplasm must still be considered. Was a biopsy taken at the time of the operation? *X*-ray examination for pancreatic calculi might also be of value, and it would be of interest to know the fat and nitrogen content of the stools, the diastase content of the urine, and the blood count. Treatment is difficult, but the regime prescribed for sprue—namely, a high-protein and low-fat diet with parenteral administration of liver extract—might be worth a trial. At the same time the caloric content of the diet should be as high as possible in order to restore the normal weight.

Lactation and Hormones

Q.—*With further reference to the treatment of small breasts in a multiparous woman dealt with on July 25 and Sept. 4, can one attempt any treatment for that condition in a patient who is already pregnant, in order to improve the chances of breast-feeding? In the two previous pregnancies breast-feeding was started and persevered with, but eventually had to be abandoned. There appeared to be quite a fair secretion of milk, but a great deal was lost between feeds, apparently through too small a "storage capacity." Pregnancy is now in the fifth month.*

A.—The mechanism of milk production is almost certainly not a factor of the oestrogenic stimulation of the breast such as was discussed in the original questions. Lactation is probably due to the release of lactogenic hormone of the anterior pituitary by means of a sort of trigger-action, admittedly acting on breasts which are already primed by the relatively large quantities of oestrogens and progestogens which are circulating in the blood stream during pregnancy. It is therefore unlikely that the apparently limited "storage capacity" of the breasts is due to the insufficient exhibition of oestrogen and progestogen during pregnancy. At parturition the breasts have every opportunity of being fully stimulated by oestrogen and progestogen. Inadequate milk-yields in the puerperium may be due to ineffective lactogenic stimulation, and the administration of lactogenic hormone has been reported to be effective in some cases. Inadequate storage does not, however, seem to be a condition which can be treated by endocrine therapy. Administration of oestrogen would, if anything, tend to decrease the milk secretion, and it has not been suggested that progestogen increases the milk storage capacity of the breasts. One of the most important factors in maintaining adequate lactation is, of course, efficient suckling.

Measuring Surface Area

Q.—*What is the formula connecting stature (sole–vertex length) and surface (skin) area in a normal human being? Would it be applicable to the foetus with expectation of trustworthy results? Could such surface–length formula be correlated with that for a right-cylinder-surface area $=2\pi$ R.L., where R = radius of base and L = length?*

A.—For a spherical body, taking L to represent any linear dimension and W to represent the weight, we can write surface area (S.A.) $=k_1L^2$ and $W=k_2L^3$, whence S.A. $=K\sqrt[3]{W^2}$. But there is no satisfactory formula connecting sole–vertex length and S.A.

[1] *A Study of Epidemic Influenza*. M.R.C. Spec. Rep. Ser., No. 228, London, 1938.

in the human being. "Normal" human beings are of very different builds and definite body types are recognized. A tall thin man and a tall robust man have very different S.A.s, but both men are "normal" for particular body types. Delafield Du Bois attempted to overcome these difficulties by introducing the so-called "linear formula," which treats separate parts of the body as approximations to cylinders. Lengths and circumferences of different parts are measured and the areas calculated. The sum of the separate areas of the parts gives the surface area of the body. The error, as judged by comparison with direct measurement of S.A., is ±2% in cases which included a baby, a tall thin man, and "a short, almost globular, woman."

The better-known formula of E. Du Bois—$S.A. = W^{0\cdot} \times H^{0\cdot725} \times 71.84$—takes different body builds into account by making an allowance for weight. The simplest formula relating S.A. and other somatic measurements is that suggested by Meeh—$S.A. = 12.3 \times \sqrt[3]{W^2}$, although more recent authorities regard the constant as being too high. Using Dreyer's formula, which relates W to *trunk* length, $W = 0.38025 \times 0.319\sqrt{l}$, where l = trunk length, S.A. can be related to trunk length. For the foetus, Lissauer's modification of the Meeh formula is $S.A. = 10.3 \times \sqrt[3]{W^2}$, and Scammon gives $W = (0.26L)^{3\cdot108} + 4.6$, where W = weight (g.) and L = crown–heel length (cm.). L can also be estimated according to the age of the foetus from $T = 2.3 + \frac{2.5L}{28} + \frac{L^2}{784}$, where T = menstrual age in lunar months. The Du Bois height–weight formula is usually taken to be applicable to the foetus. No simple application of the right-cylinder formula would be applicable except in the way used by D. Du Bois, once differentiation of form had commenced in the foetus.

I. Sandiford (*J. biol. Chem.*, 1924, **62**, 323) gives useful graphs relating age, height, length, and S.A. for the foetus, and J. Needham (*Chemical Embryology*, Vol. I, Part III) gives much information about the rate of growth.

Umbilical Hernia

Q.—*I have been perturbed in my midwifery practice by the apparently high incidence of umbilical hernia in the newborn. An unhelpful reference in a textbook to "errors in technique of dealing with the cord" has only served to worry me further. Is there any reason to suppose that umbilical hernia may be prevented by skilled handling of the cord? If so, what are the principles to be followed?*

A.—When every care is taken to avoid traction on the cord during the birth of a child and during the time of ligature before dividing the cord, it is still not uncommon to find umbilical hernia occurring when the infants are examined either before departure from hospital or a week or two later, when the mother reports for post-natal examination. There would seem, therefore, to be a considerable incidence of hernia irrespective of the care used at birth. Most of these cases, however, can be satisfactorily treated if from the earliest days any attempt at protrusion of the umbilical stump is overcome by padding a penny and using it as a splint. It can be kept in place by adhesive tape or a binder.

Koilonychia

Q.—*A woman aged 45 has had atrophic hollowed nails for the past year. What are the aetiology and treatment of this condition?*

A.—The commonest cause of atrophic hollow nails (koilonychia or spoon nails) in a female of 45 is iron deficiency. This will probably be associated with other signs of iron deficiency, such as hypochromic anaemia, angular stomatitis, glossitis, or dysphagia. The predisposing cause may be menorrhagia, and gross lesions such as fibroids should be excluded. Treatment is by iron by mouth—e.g., tab. ferri sulph. gr. 3 t.d.s., p.c., or mist. ferri et ammon. cit., *N.W.F.*, 1/2 oz., q.d.s., p.c. Koilonychia is always aggravated by manual work, and it may occur as an occupational disease unassociated with iron deficiency in those who handle strong acids and alkalis, chemical glues, etc. A rare familial and hereditary form of koilonychia has also been described.

Sulphonamides for Bronchiectasis

Q.—*Has sulphanilamide therapy been of any value in the treatment of bronchiectasis—or alternatively the use of autogenous vaccine? One case which has prompted this question has typical sputum showing a mixed flora of Micrococcus catarrhalis, diphtheroids, and scanty streptococci and pneumococci. Operation cannot be considered.*

A.—Whether bronchiectasis can be alleviated by any such measures depends on the nature of the lesion and in particular on whether the bronchial mucosa is intact or destroyed. In advanced saccular bronchiectasis with cavities lined only by granulation tissue it is obviously hopeless to expect that efforts to eliminate infection will have any permanent effect. "Typical" sputum in this form of the disease is purulent, liquid, and usually foul-smelling, with a mixed flora, including anaerobes. In the type with an intact mucosa it consists of muco-pus which is not offensive, and usually contains only a single micro-organism—often *H. influenzae*—in significant numbers. It is not clear from the question to which category this case belongs, or what significance to attach to the sputum findings.

The sulphonamide treatment of chronic infections is in general less satisfactory than that of acute, but a course of, for example, sulphadiazine (1 g. 5 times daily for a week) would be worth trying if the organism mainly responsible were of a susceptible species, such as a pneumococcus. The possible success of an autogenous vaccine is also conditional on identifying a causative organism from which it can suitably be made, and from the information given any decision made on this point in this case would appear to be dubious.

Insulin Lipodystrophy

Q.—*What is the cause of insulin lipodystrophy? How can it be prevented? I have two patients under treatment who have developed it. Both are severe diabetics. One is a girl aged 15 who has developed it both with soluble and zinc-protamine insulin. The other is a woman aged 45 who is having injections of soluble insulin.*

A.—The exact cause of insulin lipodystrophy is not known. Clinical observation relates it to the giving of many injections of insulin in one small area. This, however, is a common practice in diabetics, and only a minority of those who indulge in it get this trouble. There must therefore be another factor in the matter making for sensitivity. It does appear now quite clear that infection and preservatives do not enter into the question, nor does the purity of the insulin, because it has been observed in crystalline insulin solutions. There is, however, an impression that it is less frequent with protamine insulin than with ordinary insulin. If no further injections are given anywhere near the affected area it can be expected that in two to four years the condition will disappear. In the management of the case, therefore, the physician should draw up a map of the body, and he should indicate on it the situations where insulin should be injected on the different days (remembering that insulin can be injected into any part of the body that is not covered with hair). No injections should be put anywhere near the affected part.

Greatest Age of Conception

Q.—*What is the greatest recorded age at which conception has taken place? Does the law accept a limit to the child-bearing age?*

A.—W. A. Brend notes that many instances are reported of delivery in women over 50 years of age, some of whom have ceased menstruating several years before conception. He cites from Depasse the case of a woman who ceased to menstruate at 50 and gave birth to a healthy child at 59. More or less well authenticated instances of parturition at 60 or over are, he says, on record. Gilbertson (*B.M.J.*, 1917, **1**, 378) recorded the case of a woman whose last child was born when she was 50 years and 7 months old. Kennedy (*Edinb. med. J.*, 1882) recorded a case in which a woman gave birth to her twenty-second child when she was 63 years old, after which she still continued to menstruate. A case in which pregnancy and abortion in a woman of 55 gave rise to serious trouble is recorded in the *B.M.J.*, 1903, **2**, 325.

No limit to the child-bearing age is known in English law, but if the question arises it is treated as a matter of fact to be proved by medical and other evidence. Conveyances, however, often include in settlements a condition implying that a woman whose interest in property would pass to her offspring shall be considered infertile on reaching the age of 50. The age, until a short time ago, used to be 54; doubtless experience showed 50 to be quite safe. If such interests, vested in a woman under a settlement, are unduly hindering the potential interests of persons in whom they would vest if she had no children, and the settlement contains no such condition, the court will sometimes make an appropriate order, but only with the consent of all the interested parties.

Paul-Bunnell Test in Infectious Mononucleosis

Q.—*What is the Paul-Bunnell test? And what is its rationale? At what stage in infectious mononucleosis should it be applied, and what reliance should be placed upon it? Is there any evidence that infectious mononucleosis is commoner than formerly?*

A.—1. The Paul-Bunnell test depends on the presence in the serum of patients with infectious mononucleosis of agglutinins for sheep red blood cells. For the test, 2 to 3 c.cm. of the patient's blood is withdrawn, the serum is separated, mixed in falling dilutions with a 2% suspension of sheep blood cells (preferably a week old), incubated at 37° C. for 2 hours, and the result is read after standing overnight at room temperature or in the refrigerator.

2. These agglutinins come into the category of heterophil antibody—that is, they are evoked not by sheep cells but by the causal agent, presumably a virus, of glandular fever. This apparent anomaly is similar to the phenomenon, first described by Forssman, of the production of antibody to sheep cells by injection of guinea-pig organs into a rabbit.

3. The reaction becomes positive about the end of the first week of infection, but may be delayed till the third week or later. As a

rule it becomes negative fairly early in convalescence. As some normal sera give positive reactions in low dilutions, it is essential to establish the diagnostic titre (usually 1/50 to 1/100) with the particular technique used. False-positive reactions may also result from the injection of foreign protein. Now, many cases, because of the exudate on the throat, are diagnosed as diphtheria and given antitoxin. If the Paul-Bunnell test is done 7 to 10 days later a positive reaction may be due to the injection of the horse serum. Fortunately these false-positive agglutinins can be removed by absorption of the serum with an emulsion of guinea-pig kidney, which leaves the true agglutinins unaffected. Most cases of glandular fever with a typical blood picture (leucocytosis of 12,000 to 18,000 white blood cells, with 50 to 70% abnormal mononuclear cells) have a positive Paul-Bunnell reaction, but other clinically similar syndromes with a lymphocytosis fail to give a positive reaction.

4. There has been an increased incidence of glandular fever since the war, presumably because of the opportunities for spread among susceptible young adults brought together in the Services. Many cases are misdiagnosed—those with a rash as rubella or scarlet fever or paratyphoid; the more common anginose type with throat exudate as diphtheria.

INCOME TAX

Purchase of Remainder of Practice

G. M. bought his former partner's half-share in May, 1942, and became sole proprietor of the practice from that date. He is advised to claim "cessation and recommencement." What difference will that make to his liability to tax?

*** On whatever *basis* he is assessed, G. M. is liable to account for tax on the whole income of the practice as from May, 1942. If he does not claim cessation the basis of assessment will remain unaltered—i.e., it will be the amount of the profits of the practice (not of his share only) for the previous year. If he does claim cessation, he will be treated as starting a new practice as from May, 1942, and will pay on the basis of the actual earnings of the period to April 5, 1943, and, for 1943–4 and 1944–5, on the amount of the profits for the year to May, 1943. (He has, however, a right to have the assessments reduced to the actual profits if they should be less.) It will be seen, therefore, that "cessation" will be beneficial if the profits of the practice tend downwards (e.g., because of increased expense for assistance) and the adverse if the profits rise after May, 1942.

Life Assurance—Wife's Interest

D. H. inquires as to the effect of a whole-life policy on death duties—(*a*) if the benefit of the policy remains in his estate, and (*b*) if it is made over to his wife.

*** It has to be remembered that a life policy grows in value from year to year, and that value belongs to someone—e.g., in this sort of case either to the husband or to the wife. If the individual to whom it belongs dies, the value at that date (the "surrender value" in the case of the wife) forms part of the deceased's estate and is accordingly liable to carry death duty. D. H. should decide whether he wishes his wife to own the benefits of the policy. If he does he can either have the policy drawn up to provide for that or "assign" the policy to her. Either of these methods is preferable to giving her the money with which to pay the premiums, because the last-mentioned procedure lacks the definite legality and clearness which the other methods provide. In short, life assurance is a method of saving money. The money so saved creates an asset, and when the owner of that asset dies it is part of his or her estate. The income-tax allowance would not be affected by assignment to the wife or by payment of the premium by her.

Payment for Wife's Services

R. S. pays his wife £50 per annum for secretarial work in connexion with the practice. The inspector of taxes declines to agree to a deduction of more than £26.

*** An inspector of taxes is not entitled to say that some expenses are greater than they need have been, and if the payment of £50 is made bona fide for secretarial work the whole amount is allowable. On the other hand, however, if the £50 is clearly excessive for the value of the services rendered—which is presumably *not* the case—our correspondent might be well advised to compromise rather than take the point to appeal before the Commissioners.

J. R. pays his wife £80 a year for assistance as secretary, etc. What relief is the result?

*** The £80 can be deducted as an expense of the practice, thereby reducing the assessment on the profits by that amount. No tax is due from the wife as the amount is covered by the special allowance for wife's earnings. If the payment had been £100, the profits would have been reduced by £100, and the wife's income would have been liable to tax on £100 − 1/10 of £100 = £90, less £80—i.e., on £10.

LETTERS, NOTES, ETC.

Nail Trephining

Surg. Lieut. J. W. HALL writes: Dr. H. M. L. Murray (Oct. 23, p. 527) describes trephining the nail in cases of subungual haematoma by an ordinary twist drill. Even this instrument has a simple modification which is most successful in subungual haematoma and subcuticular whitlow. A short length of stiff wire filed to a point is heated to red heat and rested perpendicularly upon the nail. A sensation of apprehension at the cloud of smoke is all the patient need suffer if the wire is removed as soon as the nail is pierced. The release of blood or pus is as spectacular as it is gratifying. I claim no originality for this advance in surgery, as I first saw it performed by a Naval colleague who had the opportunity to perfect the instrument by the facilities offered by one of H.M. Dockyards.

Resuscitation by Rocking

Dr. A. R. NELIGAN (2nd Worcs. Home Guard) writes: There is a similar but simpler and cheaper gadget than Major Bowman Edgar's (July 24, p. 119) which works well. Lengths of 1 in. are cut from 1½-in. angle iron (many could be got from the frame of an old bedstead). Two are screwed under each pole of the Army stretcher about 3/4 in. on either side of the centre, angles towards the handles. It would be easy to fit these stops to a number of stretchers, or at any rate to have them at hand, cut and drilled; this is important when dealing with several cases at the same time—on board ship, for instance, as Dr. Keevil points out (Aug. 7, p. 179). An orderly made them for us, as well as a very good trestle from old 1-in. water-piping; but this is a luxury for teaching purposes. We can use our stretchers anywhere.

Dr. W. ST. AUBYN HUBBARD, of Mylor Bridge, Falmouth, writes to say that after reading Dr. F. C. Eve's last article in the *Journal* he had a stretcher and folding trestle constructed with a few special features. The rocking stretcher is only 7 ft. long, thus avoiding a high trestle and making it more convenient for transport. It has a bandaged figure in the Schäfer position outlined on the balloon fabric used instead of canvas. It has small cleats underneath which make it easy to bind the patient quickly and securely without knots, or to sling the stretcher from the near-side handles of a car. The whole apparatus can be made for about £3 by any competent carpenter. Instructions should be placed near the quays, stressing the importance of using the Schäfer method until the stretcher arrives and the patient is actually upon it. Dr. Hubbard also suggests that similar small boat-cleats beneath the poles of Army stretchers would prove a godsend to stretcher-bearers and R.A.M.C. personnel in forward areas. Stretcher-bearers under fire have no time to lose, and a quick method of securing casualties to the stretcher may save lives, especially when the carry is over rocky country.

Tossing the Needle

Dr. ALASTAIR BAIN (Upminster, Essex) describes the insertion of a hypodermic needle in such a way as to cause a minimum of pain. He writes: The syringe is duly loaded and with needle attached it is held as in the correct method for throwing a dart in the game known as darts. The range is about three inches, but the syringe hardly leaves the hand. In other words the hand follows through and the syringe is thrown like a dart at the target area. The patients like it, prefering it to the more orthodox method of pressing in the needle, stretching the skin at the same time. In the method here described it is desirable but not necessary to stretch the skin with the left hand. The idea—which is, no doubt, not new—was suggested to me by the technique of Dr. Katz, who recently acted as locumtenent for me. When I came home a patient told me that Dr. Katz actually tossed the needle at her for a hypodermic injection, then attached the syringe to the needle. I have not tried this, mainly because I like to have the needle attached beforehand, but the patient fully approved of the method of Dr. Katz.

Retrieving Foreign Bodies

Dr. W. E. MCCULLOCH (Kingston, Jamaica) writes: Dr. Richard Fawcitt's memorandum on the cotton-wool sandwich (March 20, p. 352) prompts me to send you this note. My practice has been to make the cotton-wool more palatable by mixing it with a generous portion of butter. It is more easily swallowed that way, and is a great advantage with children. It is astonishing how few houses have cotton-wool available at an emergency. In the case of my own nephew, who had swallowed a carpet tack, a reel of cotton thread cut into two-inch lengths and well mixed with butter was passed in twenty-four hours as a bolt in the centre of which was the tack. The most curious accident in my experience was that of a female patient who had put a pin in her mouth when she prepared for examination. An ungentle thumb on a pathological gall-bladder caused a sharp intake of breath and pin. Cotton-wool, butter, and entire confidence reassured the patient and she brought me the cocoon of the pin two days later.